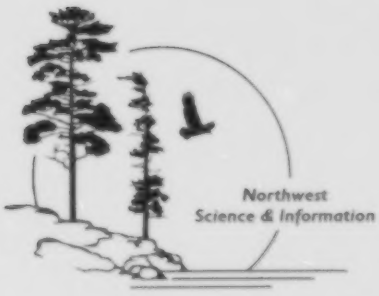

Estimates of Ecoregional Forest Composition Derived Using Modelled Bounds of Natural Variation in Northwestern Ontario

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by

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Abstract

Sustainability of forests in Ontario is mandated through various provincial policies, guides, and initiatives including Ontario's Crown Forest Sustainability Act. Sustainability, in the context of forest management, is based on ecological, social, and economic values. In this report we describe an operational method for estimating bounds of natural variation for forest composition and age-class distribution. These estimates may be useful when applied against management problems involving wildlife habitat, sustainability indicators, natural disturbance emulation, or old growth.

Regional standard forest units were used to build a basic Strategic Forest Management Model for each ecoregion and ecodistrict in northwestern Ontario. Fire cycles, natural succession, and post-fire succession rules were assembled from available data, literature, and local expertise. Additional analyses were conducted to estimate range of input fire cycles. Expert workshops involving over 50 field and science staff were used to adapt generalized knowledge to ecoregional and ecodistrict conditions. Sensitivity testing of succession and fire cycle estimates were used to develop bounds of variation. These bounds are presented in appendices for each forest unit at the regional, ecoregional, ecodistrict, and forest management unit level.

Preface

Forest managers have long sought mechanisms by which to satisfy the competing demands for the natural resources they manage. The forest ecosystems that provide these natural resources are highly dynamic. It is assumed that ecological functions such as those associated with wildlife habitats and healthy forests have evolved with this dynamic. Resource allocation and exploitation, specifically forest harvesting, is perceived to increase risk to these functions and thus to overall forest sustainability. Contemporary management paradigms suggest that this risk is reduced through management which attempts to emulate natural processes and allows for some variation in desired forest condition.

This report describes an approach to estimating bounds of natural variation of forest composition at the ecoregional level using modelling. We have used the term Bounds of Natural Variation (BNV). These bounds have value in that they provide an ecological context to the concept of desired future forest condition and a possible target range for sustainable forest management. Collectively, if all forest management units within an ecoregion contribute to this desirable range, then less risk could be attributed to the sustainability of the forest at this scale.

This concept and methodology have implications for old growth, wildlife habitat, and wood supply. It supplements knowledge and approaches to emulating natural disturbance patterns by guiding thinking about how pattern and composition collectively support an ecosystem-based approach to management at all scales including ecoregional landscapes.

The impetus for this work was the repeated request from field staff to provide more meaningful and clear support in evaluating sustainability within a forest management plan. Thus, the authors have suggested application of the BNV within the current forest management planning process. Pilot studies, using actual forest management plans in the Northwest Region, have demonstrated the feasibility of using BNV as an indicator of sustainability.

The major breakthrough represented by this work may not be in the methodology nor the estimated bounds of variation. For the first time in Ontario, this report documents region-wide thinking and analysis of fire cycles and successional pathways, especially with regard to their role in shaping natural forest landscapes. As such, it captures the state of our understanding of the forests of northwestern Ontario. It represents a benchmark from which we can share, learn and become better resource stewards. It also represents a hypothesis that may be tested and improved through empirical science.

Acknowledgements

The following made significant contributions to the refinement of the concept and development of the models used to generate bounds of natural variation: Dave Anderson, Ian Armstrong, Jim Ash, Ken Baldwin, Dave Barker, Garnet Beemer, Charlotte Bourdignon, Rob Bowen, Colin Bowling, Brian Callaghan, Brian Campbell, Marg Carruthers, Bernie Chong, Bob Forbes, Jack Harrison, Colin Hewitt, Leo Heyens, Ed Hoffmann, Ralph Horn, Ed Iskra, Derek Johnson, Eric Kaufmann, Phil Keenan, Bryne Lamarche, Janet Lane, Chris Leale, Ken Lennon, Chris Magee, Jeff Mundy, Dave New, Bruce Nichols, Leo O'Driscoll, Tara Pettit, Bob Pinder, Brian Polhill, Paul Poschman, Tom Reid, Mark Roddick, Richard Sims, Noel Smith, Len Suomo, Bill Towill, Hector Vincent, Tony Vivieros, Bob White. Bill Wiltshire, Rebecca Zeran, Fred Zroback. Their experience, insight and support was crucial to developing credible model inputs related to post-disturbance succession, and successional pathways. We thank Karen Punpur for her dedicated work in assembling this report.

Disclaimer

The views, conclusions, and recommendations are those of the author(s) and should not be construed as either policy or endorsement by the Ontario Ministry of Natural Resources.

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Introduction

User Needs: Provincial Direction

The *Policy Framework for Sustainable Forests* supports the need for a thorough evaluation of forest sustainability and specifies that forest sustainability is a primary objective of forest management in Ontario (OMNR 1993). This is accomplished through the development of forest management plans. The *Forest Management Planning Manual for Ontario* (FMPM) (OMNR 1996) suggests that objectives be established not only within a forest management unit, but also at an ecoregional level (Figure 1). When those higher order objectives are in place, management units within an ecoregion may be required to collectively contribute to their achievement. Implicit in this suggestion is a range of forest attributes considered to be a desirable future forest condition. These objectives may be different than the current ecoregional forest composition values (Racey *et al.* 2000)

Figure 1. Ecoregions of Ontario within which the ecoregional determination of bounds of natural variation are proposed. These ecoregions are primarily based on climatic and geological attributes relevant to broad forest composition, fire regimes, and successional trends

The FMPM describes the process by which forest sustainability is to be determined (OMNR 1996). The FMPM lists six criteria on which forest sustainability is to be assessed. One of these criteria, biodiversity, has three aspects including: landscape diversity, forest disturbance, and forest diversity. Each aspect is assessed and documented in the planning process. Direction on how to assess forest diversity is provided in the FMPM (Table A-2) and it states: "Within bounds of natural variation (The value for each index should fall within a defined ecoregional range)" (OMNR 1996). The direction, although vague, is in keeping with the concepts of "emulation of natural", prevalent throughout the Crown Forest Sustainability Act. These "indicators of sustainability" are reported in table FMP-13 in each forest management plan.

With the approval of the *Forest Management Guide for Natural Disturbance Pattern Emulation* (NDPEG) (OMNR 2001), direction specific to the determination of "bounds of natural variation" for landscape pattern has been expanded. The NDPEG states that forest management planners are not only to report on the bounds of natural variation in an ecoregional context as specified by the FMPM, but also to manage the forest to "move within" or "remain within" these bounds (OMNR 2001).

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Methods used to assess forest diversity have been discussed and debated since the development of the FMPM. Some of the contributing features of forest diversity are age-class structure (relative proportion of age classes in the forest) and forest composition (relative proportion of cover types). These two attributes are usually combined into an estimate of the relative proportion of age classes by cover type.

User Needs: Recommendation for a Practical Approach

Forest planners in Ontario are continuously improving the quality of forest management plans and the efficiency of plan implementation within the defined planning process. Improvements should be compatible with existing technologies and our current understanding of forest ecosystems while satisfying the intent of provincial direction and being readily understood by the general public. Above all, proponents for change must be able to demonstrate that the proposed change is practical.

Our challenge was to develop a technique that satisfied the existing policy requirements while remaining feasible given the currently used and accepted analysis tools. The methodology needed to:

- provide estimates of an acceptable range of natural variation in forest diversity that could be applied in table FMP-13 of each management plan,
- report the expected contributions on behalf of individual forest management units towards the identified "bounds" for ecoregions,
- provide indicators that fit within the adaptive management framework that is provided for by subsequent production and review of table FMP-13 and the RPFO (Report of Past Forest Operations), and
- provide a method that is feasible to implement within the planning process and that would support determinations of sustainability.

Building a Practical Approach to "Bounds of Natural Variation"

A practical approach must satisfy user needs by expressing, in a defensible manner, ecological attributes at a scale consistent with contemporary planning approaches. The proposed method characterizes current forest condition in such a way that it can be compared with estimated forest diversity changes through time under proposed management scenarios. One practical application of a bounds of natural variation (BNV) analysis would be to determine if a future forest composition produced under a proposed management alternative falls within acceptable "bounds of variation". To be consistent with provincial direction, acceptable bounds of variation should reflect a range of potential forest conditions that could plausibly be produced by forest succession, and forest disturbance regimes, without human influence. In practical terms, estimates of bounds of natural variation are developed using the same tools and assumptions used to make other critical forest management decisions such as allocation, harvest, and silvicultural decisions.

It is important to appreciate that uncontrollable natural change agents are at work while resource managers try to maintain forest parameters within desired bounds. The state of the forest must continually be monitored. Bounds should be revised as new knowledge and technology become available and management actions adjusted accordingly. "Bounds" should be viewed as a zone of acceptable risk to ecological sustainability.

Natural systems are in a constant state of change. The effects of forest succession and the stochastic nature of natural disturbances produce a constantly shifting pattern of forest communities on a landscape (Oliver and Larson 1996). Despite the dynamic nature of forest communities on forest landscapes, the amount of change that would naturally occur would likely have limits related to underlying factors (Parker and Pickett 1998). Factors such as soil condition, surficial geology, fire frequency, autecology of forest plants, climate, and other biotic interactions limit the variability of forest cover types and influence the relative age-class structure of the forest.

Computer models are used to predict future forest composition under estimated natural influences and under varying management alternatives. These models rely on inputs related to forest succession and natural disturbance, modified by local knowledge of soils and climate. Professional insight is critical in constructing such models. This is particularly important in northwestern Ontario where significant climatic gradients may contribute to substantial variation in successional relationships even within ecoregions. In all cases, a range of estimated inputs is derived based, in part, on our level of confidence in the data and its interpretation. The range of inputs can then be incorporated into various versions of the same forest model. The resulting range of outputs provides an estimate of the range of natural variation in forest cover.

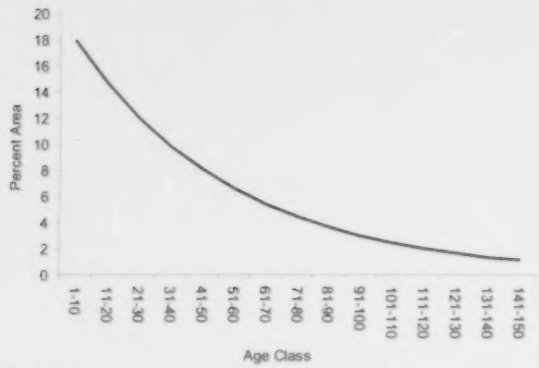
Van Wagner (1978) made a significant advance in the understanding of fire disturbance and its influence on the age-class structure of forests. Van Wagner demonstrated that natural disturbance regimes associated with fire and other processes likely produce a greater abundance of younger forests than older forests (Figure 2a).

Modern forest models produce similar results as van Wagner's theoretical curve. Altering the fire cycle in a forest model will result in variability of the shape of this curve. Shorter fire cycles drive more area to younger age classes and longer fire cycles leave more area in older age classes (Figure 2b).

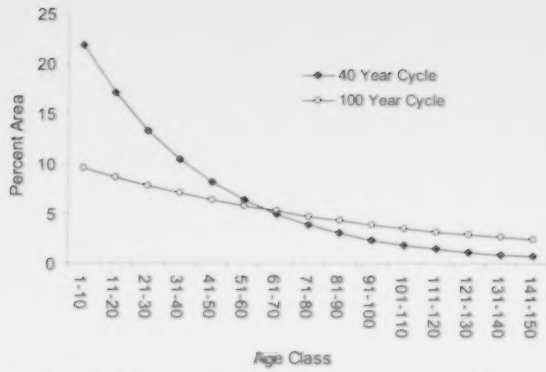
Van Wagner's curve would be very difficult to emulate through forest management, as a fixed percentage of every age class would require harvesting each year. Alternatively, classical forest management practices suggest producing a "normal forest" which has an equal amount of area in each age-class and, achieved by harvesting the oldest stands first. However, managing forests to a normalized structure has been viewed as artificial and the practice has been discontinued in Ontario.

A combination of the two concepts; incorporating the equal area concept of the normal forest with distinct segments that mimic the forest structure of van Wagner's curve promises to be a reasonably feasible solution. This would be practical if distinct segments were age-class groupings that approximated forest ages that fall: below normal operability ages, within normal operability limits, and those that are beginning to exhibit attributes of "old growth" (Uhlig *et al.* 2001) (Figure 2c). An appropriate balance would be struck between the "emulation of natural" concept and feasibility of implementation.

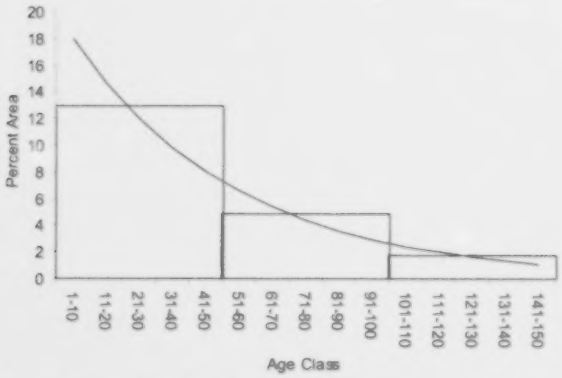
Using the concept of area variation by age class (Figure 2b), and the combined forest regulation system proposed above (Figure 2c), it is possible to derive indicators to evaluate forest diversity. For each age class/forest cover grouping, modelling variations of natural processes will provide upper and lower estimates of the amount of area expected to possess those attributes. The highest and lowest values identified from the modelling exercise for each of the age-class groupings, would approximate the upper and lower bounds of natural variation. This would provide an effective gauge to assess the



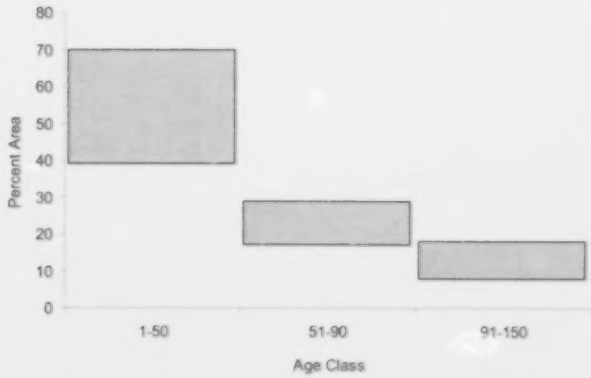
2a. Van Wagner's projected age-class distribution for a 50 year fire cycle.



2b. Variation in projected age-class distribution due to changing from a 40 year to 100 year fire cycle.



2c. Theoretical structure for a forest as produced by a single model run; divided into three age-class groupings.



2d. Hypothetical estimates of an area within which an age class may be expected to vary; generated by determining the structure of a forest for multiple varying inputs.

Figure 2. Estimation of natural variation in forest area as determined by modelling multiple forest structures. This approach is valid across the whole forest and for specific forest units.

sustainability of forest diversity (Figure 2d), providing a benchmark against which forest managers can compare current forest conditions, and suggest appropriate proactive or remedial management actions.

Methods and Rationale

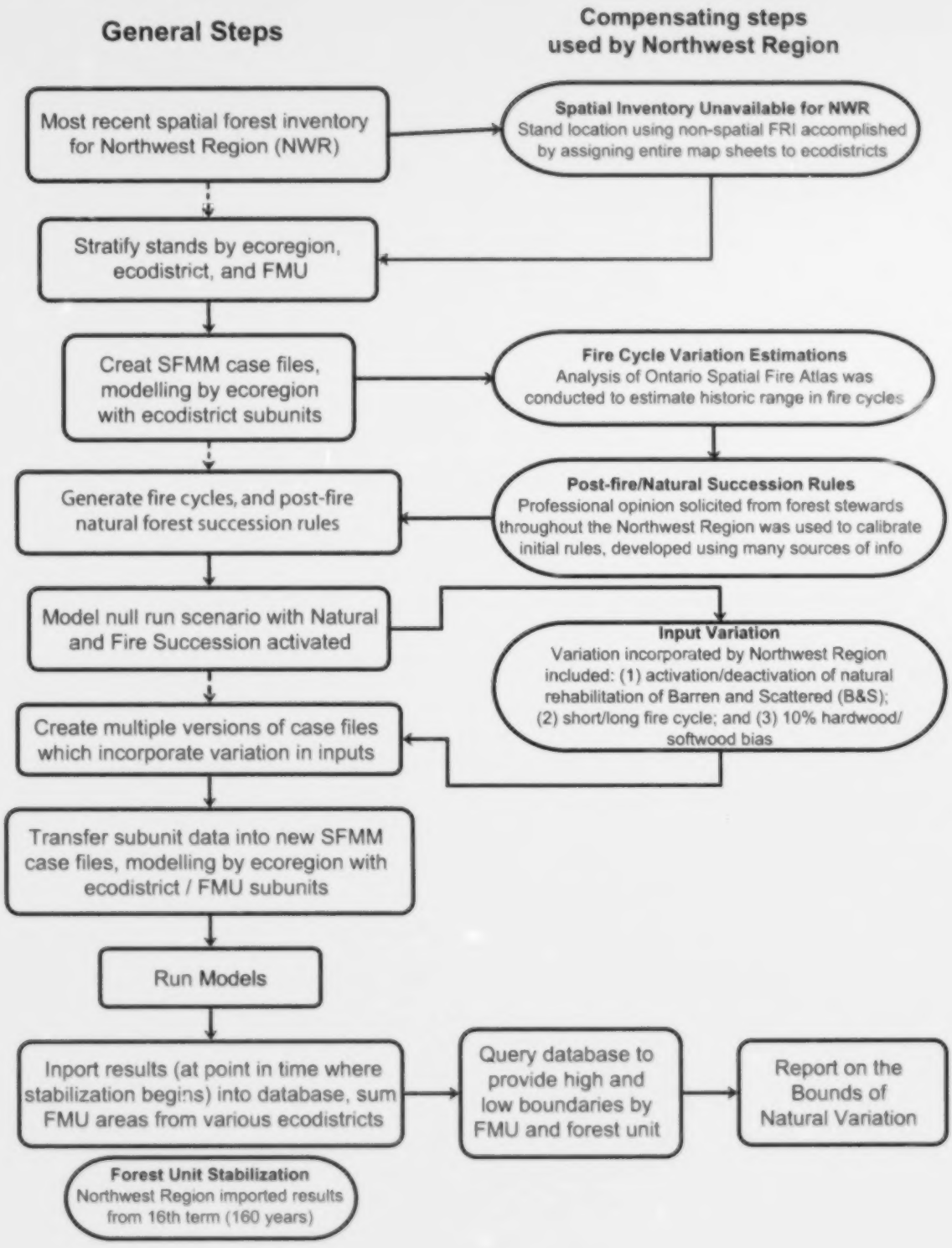
This section describes our methodology for estimating upper and lower bounds of natural variation for an ecoregion or ecodistrict. It discusses each of the steps in assembling data, performing the analysis, displaying, and interpreting the results. A flow chart of the methodology (Figure 3) provides context for each of the tasks discussed.

Step 1 Assemble Forest Inventory

BNV were calculated using non-spatial or tabular Forest Resources Inventory (FRI) data, as spatial coverages for all ecoregions were not available for this 2000 analysis. Forest inventory data were allocated to geographic land units by Ontario Base Map (OBM). While OBMs cover areas larger than forest stands, they were considered acceptable for the scale of the analysis performed.

While Sustainable Forest Licence (SFL) holders will be required to furnish OMNR with a spatial inventory (OMNR 2001), no date has yet been set that directs the creation and maintenance of spatial inventories for Ontario's

Figure 3. Bounds estimation flow chart.


General Steps
Compensating steps used by Northwest Region
Most recent spatial forest inventory for Northwest Region (NWR)
Spatial Inventory Unavailable for NWR
Stand location using non-spatial FRI accomplished by assigning entire map sheets to ecodistricts
Stratify stands by ecoregion, ecodistrict, and FMU
Creat SFMM case files, modelling by ecoregion with ecodistrict subunits
Fire Cycle Variation Estimations
Analysis of Ontario Spatial Fire Atlas was conducted to estimate historic range in fire cycles
Generate fire cycles, and post-fire natural forest succession rules
Post-fire/Natural Succession Rules
Professional opinion solicited from forest stewards throughout the Northwest Region was used to calibrate initial rules, developed using many sources of info
Model null run scenario with Natural and Fire Succession activated
Input Variation
Variation incorporated by Northwest Region included: (1) activation/deactivation of natural rehabilitation of Barren and Scattered (B&S); (2) short/long fire cycle; and (3) 10% hardwood/ softwood bias
Create multiple versions of case files which incorporate variation in inputs
Transfer subunit data into new SFMM case files, modelling by ecoregion with ecodistrict / FMU subunits
Run Models
Inport results (at point in time where stabilization begins) into database, sum FMU areas from various ecodistricts
Query database to provide high and low boundaries by FMU and forest unit
Report on the Bounds of Natural Variation
Forest Unit Stabilization
Northwest Region imported results from 16th term (160 years)

provincial parks. Provincial parks now make up approximately 12 percent of Ontario's landscape and must be included in the "bounds" determination analyses in order to be relevant at the ecoregional scale.

Spatial inventories would be more useful because they allow for improved stratification of stands into larger ecological units than non-spatial inventories. Where spatial inventories exist for entire ecoregions, they should be stratified at the stand level. Methods of stratification are discussed in Step 2.

Step 2: Preparing Inventory Data for Analysis

The value for each forest diversity index should fall within a defined ecoregional range (FMPM Figure A-2, OMNR 1996). There are six ecoregions covering northwestern Ontario's forested landscape (Figure 4). These ecoregions are based on *Site Regions of Ontario*, developed by Hills (1961), and later revised by Burger (1993), Crins (2000) and Crins and Gray (2001). Forest inventory is only available for a small portion of Ecoregion 2W and about two-thirds of 3S.

Figure 4. Revised ecoregions in OMNR's administrative Northwest Region (Crins and Gray 2001).

Climate factors (temperature, moisture, and growing season), fire regimes, and geological factors contribute to both broad scale vegetation patterns, and processes within ecoregions (Crins 2000). Ecodistricts are nested within ecoregions. Ecodistrict differentiation reflects landforms, physiography, and significant localized climatic phenomena (Figures 4, 5a and 5b). The combined landform, soils, and climate factors expressed at the ecodistrict level has profound influences on fire intensity, post-fire succession, and successional pathways. Ecodistricts are, by definition, characterized by relatively homogeneous physiographic features which influence the successional trends exhibited by the predominant vegetation types (Crins 2000).

Ecoregion and ecodistrict boundaries are intricately shaped, and conform to identifiable landform features such as rivers, lakes, and hill tops (Figures 4 and 5). This level of precision facilitates the stratification of spatial inventories. For modelling purposes, stands are stratified by ecodistricts, and by FMU or provincial park.

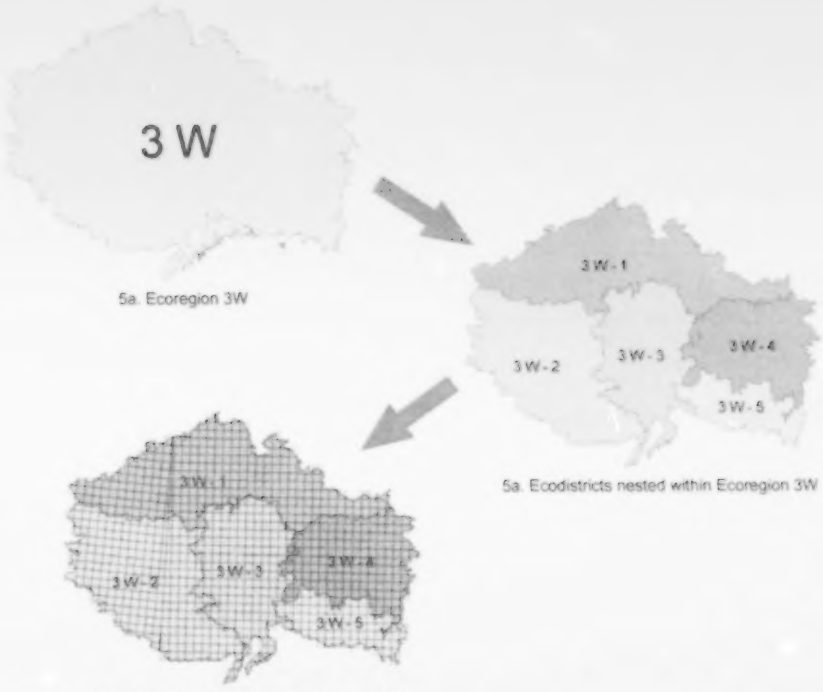


Figure 5. Comparison of scale at which stratification of FRI data occurred.

When inventory information is non-spatial (tabular) the stands in an inventory can still be aggregated into the smallest-scale measure of location available, in this case the Ontario Basemap (OBM) grid. These grids were then stratified using the revised Ecological Land Classification (ELC) boundaries. Where a group of stands (i.e. OBMs) straddle the boundary between two or more ecodistricts, all data associated with the OBM was assigned to one of the ecodistricts, based on the location of its centre point (Figure 6). This method of stratification is based on the assumption that while some stands in the polygon do not belong to the ecodistrict to which they were assigned, the stands of other bordering polygons assigned to the other ecodistrict will roughly balance in area and composition.

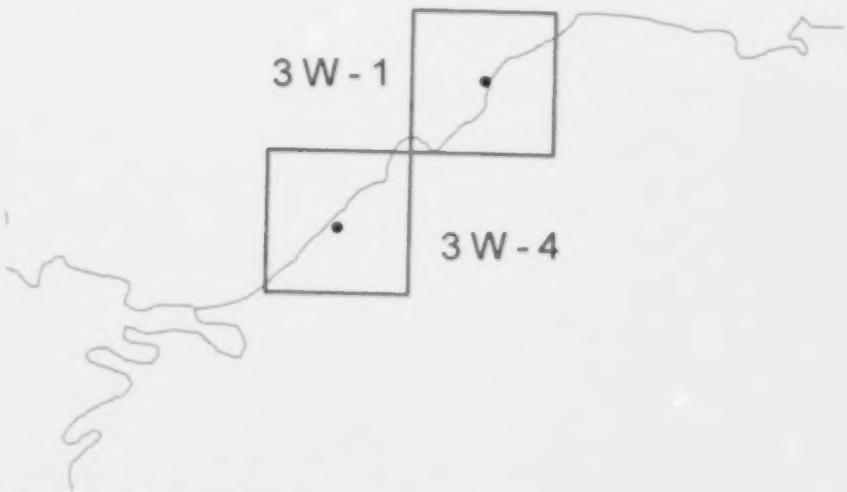


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Figure 6. Stratification technique each OBM (box) is assigned a centre point; then the OBMs are assigned to an ecodistrict depending on which side of the boundary (line) the centre points lay.

Our method of stratification, while not as accurate as using a fully spatial inventory, is valid for our purposes. Transitions along ecoregional boundaries are gradual and the intricate boundaries of the current ELC architecture are primarily designed as unambiguous lines for stratification and planning purposes. Figure 7a illustrates the broad transitional borders of ELC units, as published prior to 2000 (Crins 2000). There is not a sharp transition between ecodistricts or ecoregions, as denoted by the thick lines. In reality, most transitions between ecoregions or ecodistricts represent gradual environmental gradients in climatic variables or relatively discrete changes in geomorphological variables. While the most recent ELC boundaries are identified precisely (Figure 7b), the notion of gradual transition is still understood, and accepted.

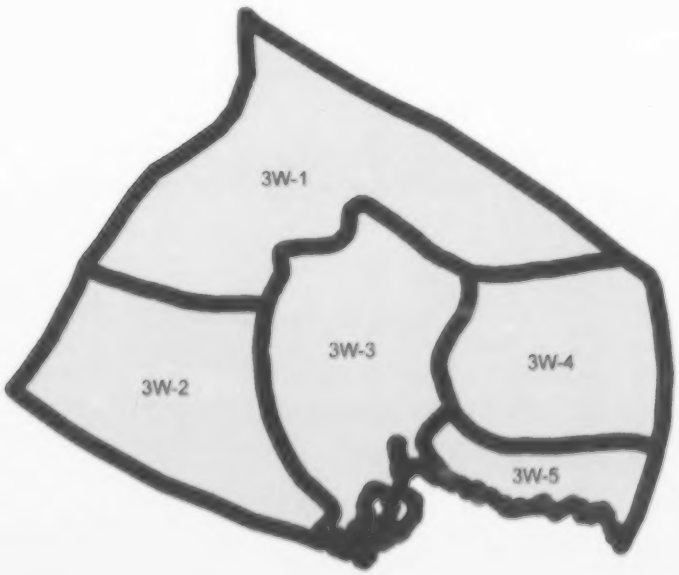


Figure 7a. Ecodistrict boundaries within Ecoregion 3W (Burger 1993).

Figure 7b. Ecodistrict boundaries within Ecoregion 3W (Crinns 2000).

Step 3 Developing a Benchmark Model

Once the inventories were stratified by ecodistricts, FMU, or provincial park, the entire inventory was imported into a non-spatial forest growth model. In this case we used Ontario's Strategic Forest Management Model (SFMM). SFMM is recommended by the Forest Management Planning Manual (OMNR 1996) for the strategic modelling of forests under various proposed management alternatives and is currently used in all forest management plans in Ontario. Choice of this model was a pragmatic consideration to ensure transparency of process, efficient exchange of information, and conceptual compatibility with the forest management planning process.

SFMM was developed to use a classification of forest stands called Forest Units. Forest Units are user-defined and represent forest cover characteristics and other descriptors that facilitate model interpretation and proposed management implications. MNR has identified standardized forest units and recommends their use. This project used slightly modified versions of these standard forest units. A comparison of the Northwest Region Standard Forest Units, and the forest units used for this project are provided in Appendix A.

Benchmark models feature forest successional pathways and trends where human influence is absent. The information contained in the benchmark models represents our best understanding of successional and natural disturbance trends.

Preliminary models were constructed from data sources including: inputs of existing forest management models, growth and yield databases, forest ecosystem classification databases, published literature, old growth analysis, and some historical forest composition records. Summaries of these data are captured in existing synoptic reports (Sims *et al.* 1990, OMNR 1997, Kenkel *et al.* 1998). Professional opinion of many practising and retired foresters, biologists, ecologists, and forest analysts was solicited to calibrate the preliminary models. These opinions were usually based on extensive local experience in a specific ecodistrict or management unit, especially with respect to successional relationships or post-fire effects. Sensitivity analyses were conducted on the benchmark models to ensure they worked in a logical and consistent manner.

Regional workshops were undertaken to solicit the professional opinion and calibration of the benchmark models. Workshops were located in Thunder Bay, Dryden, Fort Frances, Kenora, Longlac, and Nipigon. A total of 48 participants contributed their local knowledge of the surrounding forest landscapes. Participants reviewed the preliminary succession and fire cycle information and made recommendations for improvements. The professional opinion of these participants was recorded and catalogued; suggested alterations were evaluated and later incorporated into the models when appropriate.

The resulting catalogue of "natural" succession trends used in the benchmark models is provided in Appendix B; the "post-fire" successional inputs catalogue is provided in Appendix C.

Step 4 Modelling for BNV – Incorporating Variability

This modelling phase generates bounds based on a sensitivity analysis of the model inputs. Bias was imposed on model parameters to address uncertainty around "best" estimates generated from empirical science and expert opinion. To generate "bounds" in the Northwest Region, we recognized the variation of three input factors: forest succession rules, estimated fire cycles, and the rehabilitation or non-rehabilitation of barren and scattered

lands (Figure 8). The assumptions were that if we suddenly allowed the forest to operate under natural conditions, it would slowly revert to a more natural state. We believe this to be true for most of the common forest units, but not as likely for species such as white pine and red pine.

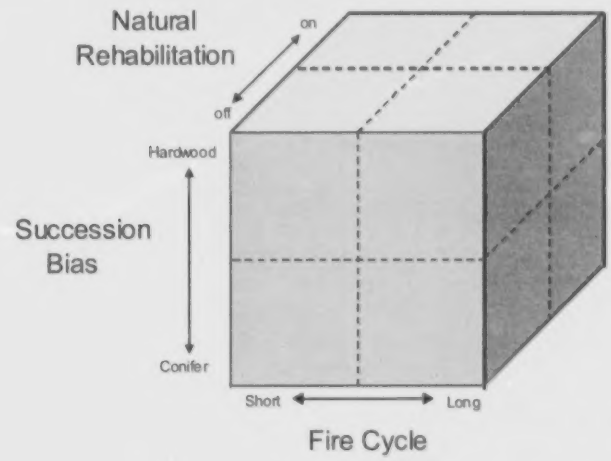


Figure 8. Three dimensions of variability that were used in sensitivity analysis when generating the natural variability of forest composition from a deterministic model for the BNV project.

Succession Rules

Bias was incorporated into both SFMM succession input screens (i.e. natural succession, and post-fire succession). The biases reflected enrichments of 10 percent conifer or 10 percent hardwood of the successional trends identified by the benchmark models.

Wherever possible, radical transitions in stand dynamics due to 10 percent enrichment of either hardwood or conifer species were prevented. The most likely alternate forest unit, based on successional pathways (Appendix B), was selected to represent this bias. This concept is illustrated by the following examples:

- Consider pure black spruce stands that would typically succeed back to a pure black spruce forest unit following a long period of time with no fire event (natural succession). When applying 10 percent hardwood enrichment for purposes of generating a range of compositional variability, it would not show new trends like 10 percent of the canopy cover moving to a pure aspen forest unit. Instead, the succession rules would show 10 percent of the canopy cover naturally succeeding to a spruce-dominated mixedwood. Our current understanding of autecology and succession are adequate to make these assumptions. Often, the pure spruce forest unit will have as much as 20 percent hardwood component (Appendix A).
- Alternatively, if the same forest unit were to experience a 10 percent conifer enrichment, the succession rules would likely show a decline of canopy area moving to a mixed conifer forest unit favouring a stronger return rate to the pure spruce forest unit.

This approach accommodates both the uncertainty in successional pathways and the stochastic behaviour of natural systems emanating from variation in fire intensity and geographic context.

Estimated Fire Cycles

Analyses were undertaken to identify the expected natural range that a fire regime might exhibit at the ecodistrict level (See Step 3). Similar to the efforts put forth by Bridge (2001), but with slightly different methodology, data from Ontario's digital Forest Fire Atlas (Perera *et al.* 1998) was used to identify natural limits of fire cycles at the ecodistrict level (Appendix D).

Upper and lower fire cycle estimations derived from the analysis (Appendix D) were then altered slightly to reflect the relative flammability expected for the various forest units. The alterations from the average upper or lower fire cycles by forest unit are detailed in Appendix E of this report. Upper and lower fire cycles were then applied to the model matrix as a source of variability.

Natural Rehabilitation

A third source of variation was added to the variability matrix and considered a mitigating action. Resource managers, when updating their forest resource inventory, often list stands that are not yet free-to-grow, as "barren and scattered". This often makes the identification of real barren and scattered stands difficult. To mitigate this problem, modelling was conducted such that labelled "barren and scattered" were either included or excluded in their entirety.

In instances where barren and scattered stands were included, stands were forced to naturally regress to their originating forest units with a rate of return of five percent per year.

The variability matrix depicted in Figure 8, would exhibit the following characteristics:

Table 1. Variation characteristics of models used to make BNV determinations.

Matrix Cell No.	Natural Succession Bias	Fire Cycle	Natural Rehabilitation
1	pro-conifer	short	all
2	pro-conifer	short	none
3	pro-conifer	long	all
4	pro-conifer	long	none
5	pro-hardwood	short	all
6	pro-hardwood	short	none
7	pro-hardwood	long	all
8	pro-hardwood	long	none

Once variability was added to each of the eight matrix cells for all models, further sensitivity analyses were conducted to verify that the models showing significant changes from the original benchmark models were still operating logically. These actions allowed for eight separate estimations reflecting all interactions of the three sources of variability: natural succession bias, fire cycle, and natural rehabilitation of "barren and scattered" stands. From these eight estimations, the highest and lowest were used to establish the upper and lower estimated bounds of natural variation for each age class.

The final result of the second phase of modelling was a collection of forest composition variability-matrices spanning northwestern Ontario, modelled at the ecoregional level, and using ecodistricts as the model subunits.

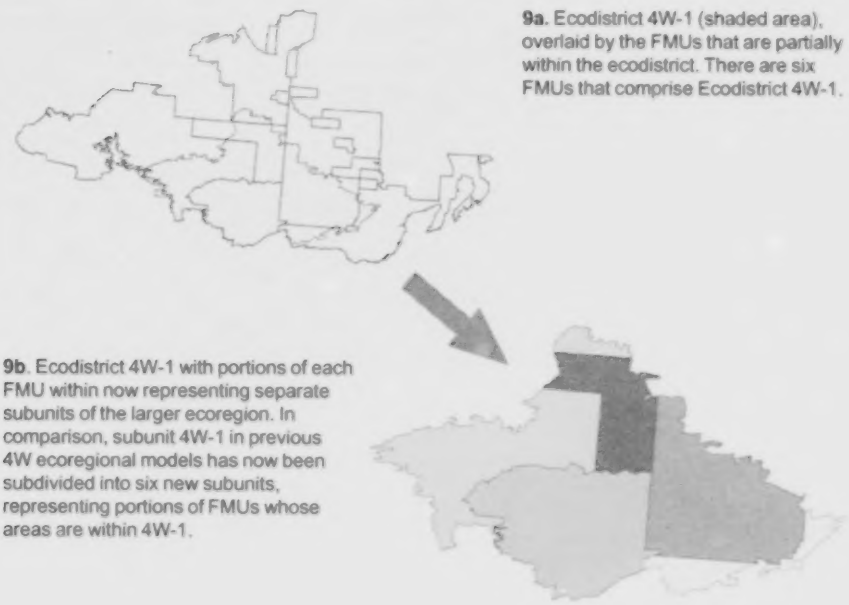
Step 5 Apportioning Forest Condition and Variation to Management Units

The third phase of modelling bridges the ecoregional BNV to individual forest management units. SFMM case files were developed to represent individual portions of FMUs in each ecodistrict. A visual representation of this concept is provided in Figure 9.

Unique ecodistrict–FMU identifiers were created for each stand or Ontario Base Map using the original inventory database. The newly created field was then used to identify subunits when re-importing the inventory into SFMMTool and SFMM.

Models were generated in SFMM with the expanded framework described in Figure 9 (modelled at the ecoregional level, with ecodistrict–FMU portions as model subunits), corresponding with each of the eight "variation-matrix cell" models (modelled at the ecoregional level, with ecodistricts as model subunits). Model inputs were then copied from each of the ecodistrict subunit models, to the corresponding ecodistrict–FMU subunit models. This ensured that each sub-model was calibrated using the FRI components specific to the subunit land base.

Figure 9. Schematic depiction of shift from ecoregional variability modelling using ecodistricts as model subunits, to ecoregional modelling using portions of FMUs by ecodistrict as model subunits.



9a. Ecodistrict 4W-1 (shaded area), overlaid by the FMUs that are partially within the ecodistrict. There are six FMUs that comprise Ecodistrict 4W-1.

9b. Ecodistrict 4W-1 with portions of each FMU within now representing separate subunits of the larger ecoregion. In comparison, subunit 4W-1 in previous 4W ecoregional models has now been subdivided into six new subunits, representing portions of FMUs whose areas are within 4W-1.

The final result of the modelling was a collection of variability-matrices spanning northwestern Ontario: modelled at the ecoregional level, and using ecodistrict–FMU portions as the model subunits.

Step 6 Generating a BNV Results Database

Once modelling was completed, each model was reviewed. The time period where forest unit stabilization occurred was identified. The point of stabilization refers to a point in time, beyond which only minor fluctuations in forest unit area (if any) occurs. The point of forest unit stabilization for this analysis was generally observed to have occurred near the 16th term of the planning horizon, or about the 160th year. Therefore, model results of forest composition and structure were taken from the 16th term in the planning horizon.

Reported areas by forest unit were copied from the "*All Even-Aged Forest by Age class and Subunit*" reporting table, in the *Results* section of SFMM, and pasted into a spreadsheet. The reformatted results were then collated into a BNV Results database (Appendix F).

Records in the BNV Results database were then classified as either "immature", "mature", or "old growth", with onset ages for each class varying by forest unit (Table 2).

Table 2. Broad age classes used in BNV analyses.

Note: While this exercise uses an age-class category entitled "Old Growth", the authors do not imply compatability with other definitions of old growth in policy or management.

Forest Unit	Broad Age Class		
	Immature	Mature	Old Growth
BfDom	0 - 49	50 - 79	80+
BwDom	0 - 49	50 - 109	110+
ConMx	0 - 49	50 - 109	110+
HrdMw	0 - 49	50 - 99	100+
HrDom	0 - 49	50 - 99	100+
OCLow	0 - 49	50 - 129	130+
OthHd	0 - 49	50 - 89	90+
PjDee	0 - 49	50 - 99	100+
PjMx1	0 - 49	50 - 99	100+
PoDee	0 - 49	50 - 99	100+
PrDom	0 - 49	50 - 129	130+
PrwMx	0 - 49	50 - 139	140+
PwDom	0 - 49	50 - 149	150+
SbDee	0 - 49	50 - 119	120+
SbLow	0 - 49	50 - 159	160+
SbMx1	0 - 49	50 - 109	110+
Shurb	0 - 49	50 - 119	120+

Records having an age class younger than 50 years were classified as "immature" regardless of forest unit. Old growth onset ages by forest unit used to class the remaining database records as either "mature" or "old growth" are provided in Table 2. The values detailed in Appendix F reflect average onset ages by standard forest unit as reported in Appendix A (Boreal West Forest) of the draft "Old Growth Definitions for Ontario" (Uhlig *et al.* 2001). Any records having an age above 49 years, yet below the old growth onset age by forest unit was classified as "mature". Subsequently, any records whose age class met or exceeded the old growth onset age by forest unit listed in Table 2 was classified as "old growth".

Step 7 Generating BNV Results

The BNV Results database table, having been given operability classifications of either "immature", "mature", or "old growth", was subsequently queried to provide "bounds of natural variation" estimates at four levels of geographic organization: forest management unit, administrative region, ecoregion, and ecodistrict.

The first reporting level, and that relevant to planning teams seeking to conduct a non-spatial BNV analysis on proposed management alternatives, are upper and lower bounds reported by age class, by forest unit, and by FMU. This is the level most appropriate for interpretation as a sustainability indicator. Care was taken at this reporting level, not to simply query the database for maximum and minimum reported areas, but to first sum all areas belonging to the same

age class, forest unit, FMU, and matrix ID, that were spread in small portions across numerous ecodistricts and ecoregions. Once summed, the first reporting level was generated (Appendix F).

Similarly, reporting the estimated range of natural variation by forest unit and age class can be made at broader scales. Ecodistrict, ecoregion and regional estimates can be found in Appendices G, H, and I respectively.

Discussion

BNV as a tool to evaluate forest sustainability within the context of a forest management plan has limitations. Some of these limitations relate to assumptions and some relate to the data or application within the forest management planning process. It is important to know some of these limitations when interpreting and applying the results (Table 3).

Table 3. Limitations to consider when using BNV to evaluate sustainability.

Assumptions	Issues	Rationale
A modelling approach can give a reasonable estimate of natural forest conditions.	Reconstruction of historical forest would be best if sufficient reliable data existed prior to estenisve commercial forest harvest activity or large numbers of fires caused by land clearing and industrial activities.	All major decisions in forest management are supported by modelling to some degree. SFMM is used to estimate future wood supply, response to silviculture, and natural forest change. Selection of modelling approaches (supported by empirical data) to estimate natural variation in age-class structure and forest composition provides a methodology consistent with other components of the forest management planning process.
The current forest, if placed under a realistic natural disturbance regime will eventually move towards a natural forest condition.	The current inventory is imperfect and some of our current forest has been heavily modified by past management practices.	The two northern regions have been practising forest management over the last 100 years, and are probably much closer to a natural forest condition than the forests of the Southern Region. For the common forest species (see below) the chances of reconstructing a natural forest cover and age-class structure by modelling are considered good.
Greatest reliability will be found within the common forest species.	Red and white pine, and some other species, exist in a greatly altered state on the landscape and do not respond well to reconstructive modelling.	Boreal species such as jack pine, black spruce, and trembling aspen have predictable natural and post-fire succession trends. Therefore, reasonably reliable estimates of forest cover and age-class structure can be achieved. Estimates of other species such as red and white pine may be determined through historical reconstructions using empirical data from historical records. Always use the best data available.

Assumptions	Issues	Rationale
Estimates of natural fire cycles are adequate to approximate natural disturbance regimes	A natural disturbance regime includes more than fire. Natural fire cycle is a statistical concept only crudely approximated within the short period of time for which valid empirical data is available	The major stand-replacing natural disturbance event in the boreal forest is fire. Other disturbances such as blowdown and insect infestation ar . often, but not always, followed by fire. Non-stand-replacing fire and insect and disease losses are normally addressed through successional pathways. Gap phase replacement is captured in the successional pathways.
Fire cycle range estimates (Appendix D) are appropriate for developing bounds of natural variation.	Estimates are based on cumulative averaging. The time period for which empirical data is available is very short for reliable and precise estimates.	Fire cycle is a statistical construct and estimates (Appendix D) exhibit larger range of values due to small data set. Therefore estimated bounds of natural variation are likely wider and more conservative than expected. Interpretation of results for planning should consider these wider bounds when evaluating forest management scenarios. These estimates are more likely to be inclusive than exclusive.
Ecoregions are appropriate land units upon which to derive natural bounds.	Management decisions are made on management units, staff are organized by administrative districts and regions.	Forest diversity measures are naturally governed by ecological processes closely associated with climate and major land forming processes. Ecoregions are large enough to account for these processes. Further refinement to the ecodistrict level may be appropriate in very heterogeneous ecoregions.
Special succession paths developed to support BNV estimates are needed to reconstruct forest condition.	Succession rules in forest management planning often reflect pragmatic artifacts such as volume or operability adjustments.	BNV work often requires refinements of the natural succession rules developed for a forest management plan, particularly with regard to age at break-up or age following break-up. Refinements are required to adequately address age-class structure, and older forest conditions.
Sensitivity testing is a reasonable means of estimating variation.	True natural variation can be quite extreme. Even long-term trends in climate can contribute to changes in these bounds.	Empirical data has inherent uncertainty measured in confidence intervals, and expert opinion has a similar range of confidence. As with all modelling, best estimates are based on our best inputs. Pushing estimates lower and higher to improve our confidence for sensitivity testing of input estimates approximates uncertainty associated with climate, forest health, and chance.

Reconstructing natural forest condition and estimating bounds of variation though modelling has limitations. One of the most significant limitations is the reliance on existing forest inventory for the initialization of the modelling. The further a forest is from its historic condition, the more difficult it may be to reconstruct a plausible natural age-class structure and forest cover. A plausible natural forest condition can be reached when the modelled forest reaches equilibrium under its "natural" disturbance regime and succession pathways. This will not produce the same estimate of forest composition as a historical reconstruction. For example, species such as red and white pine have been largely removed from northwestern Ontario's forests. Estimates of pre-settlement levels of abundance may never be achieved through a modelling exercise alone. Without an available seed source, it would not be logical to assume that natural processes would restore these species to their original abundance, at least not in the time frame of this model and not with the type of inventory available. Therefore, these models should not be used for an assessment of natural extents of red and white pine.

Although the intent of these models is to generate estimates of natural variability, the inputs to these models were largely derived from expert opinion, and supported by empirical data. Future empirical testing of these model projections is strongly recommended.

Application of BNV in Planning

This methodology describes how bounds of natural variation can be estimated at an ecoregional scale. This section briefly describes how to relate BNV to each FMU during forest management planning.

Once the forest management unit bounds are estimated, it is still necessary to understand and reconcile differences in modelling approaches and scales between the forest management unit and the ecoregion. A relatively standardized process of comparing site regional modelling with local modelling and assessing the sustainability of forest diversity needs to be developed. Discrepancies are expected to exist between an FMU's SFMM null run (natural benchmark) and the ecoregional analysis. These two analyses are run independently, often using modified forest unit definitions. Where they project a similar future forest condition there will exist a higher level of confidence in the forecast. When the two approaches differ, a weakness in one or the other model is generally revealed. These weaknesses can then be addressed within the planning process.

This methodology was derived as part of a pilot project delivered in the Northwest Region 1998–2001. Throughout the pilot phase, several forest management planning teams had substantial input in reshaping the original concept of implementing the BNV. The resultant process is described in the draft document *Bouncing Ball Analysis: A How-To Guide For FMP Teams to Assess the Sustainability of Forest Diversity With Respect to the BNV Pilot Project* (Ride 2000).

Conclusions

It is feasible to estimate an Ecoregional forest cover and age-class structure to support ecological context for forest management plans, future planning and very preliminary old growth implementation. Sensitivity testing to the extent of our confidence in natural fire cycles and succession pathways provides for a reasonable estimate of "bounds of natural variation". These bounds provide a potential target zone for sustainable forest management and for a desired future forest condition at the ecoregional level.

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Appendices

Appendix A

Summary of Forest Units

This BNV analysis used modified Northwest Region Standard Forest Units. Tables A-1 and A-2 identify the characteristics and SFMMTool query descriptors for the Northwest Region's Standard Forest Units respectively. Modifications included:

- "low" forest units were not identified, thus leaving those areas in their respective "deep" forest units. Identification of shallow sites for black spruce, jack pine, and trembling aspen under the Northwest Region's SFMMTool query descriptors used Plonski-based estimations of stocking as the sole identifier. Our interpretation was that refinement beyond general classifications of pure forest units for the aforementioned species, was unnecessary, as it unduly increased the potential for forest unit classification error. Table A-3 identifies the SFMMTool query descriptors of the forest units used in the BNV analyses for all areas of northwestern Ontario, save ecodistricts 4W-2, 3W-5, and the portion of Ecodistrict 3W-3 located between Lake Nipigon and Lake Superior.
- Ecodistricts 4W-2, 3W-5, and the portion of Ecodistrict 3W-3 located between Lake Nipigon and Lake Superior were considered to have an additional, unique forest unit, non-existent in the rest of northwestern Ontario. Identified during consultation meetings with forestry and wildlife professionals throughout the region, was a naturally-occurring, long-lived, shade-tolerant, "shrub" forest unit occuring in the wet rich soils of the landscape along the north shores of Lake Superior, which occupies sites for periods surpassing 60 years. Therefore, query descriptors were specifically designed in SFMMTool, to account for the occurrence of such forest units, and to identify candidate stands. The listing of forest units and SFMMTool query descriptors used by this study that include a "shrub" forest unit is provided in Table A-4.

Note: The order of listing for forest units in Tables A-2, A-3, and A-4 denote the priority used to identify stands in SFMMTool.

Table A-1. MNR Standard Forest Unit Characteristics Listing for the Northwest Region.

Forest Unit	Characteristics
PwDom	White pine greater than 40%
PrDom	Red pine greater than 70% - fire origin present stands and plantation intensive stands
PrwMx	Red and white pine greater than 40% - significant for red pine white pine strategy
OCLow	Lowland conifer - Ce and La - sensitive sites
SbLow	Black spruce lowland - sensitive sites
SbDee	Black spruce upland - high productivity - >=.7 Sb significant for natural and post harvest successional pathways
SbSha	Black spruce upland - sensitive sites
PjDee	Jack pine upland - high productivity - >=.7 Pj significant for natural and post harvest successional pathways
PjSha	Jack pine upland - sensitive sites
PoDee	Poplar - high productivity - >=.7 Po significant for natural and post harvest successional pathways
PoSha	Poplar - sensitive sites
BwDom	White birch dominated site high hardwood component significant for natural and post harvest successional pathways
OthHd	Other hardwood - significant under represented sites
SbMx1	Black spruce mixedwood - >=.7 conifer significant for natural and post harvest successional pathways
PjMx1	Jack pine mixedwood - >=.7 conifer significant for natural and post harvest successional pathways
BfDom	Balsam fir dominated sites significant for natural and post harvest successional pathways
ConMx	Conifer mixedwood - >=.5 conifer significant to distinguish conifer ecosites from hardwood ecosites
HrDom	Hardwood mixedwood - >=.7 hardwood significant for natural and post harvest successional pathways
HrdMw	Hardwood mixedwood - >=.5 hardwood significant to distinguish hardwood ecosites from conifer ecosites
Unknown	default

Table A-2. SFMMTool query descriptors for Northwest Region Standard Forest Units.

Forest Unit	Characteristics
PwDom	PW >= 0.4
PrDom	PR >= 0.7
PrwMx	PW + PR >= 0.4
OCLow	CE + LA >= 0.5 or WG = "Ce" or WG = "La" and PR + PW + PJ + SW + BW + < 0.1
SbLow	(SB + CE + LA >= 1 and (SC = "3" or SC = "4")) or (SB + CE + LA = 1 and CE + LA >= 0.1 and (vSC = "1" or SC = "2")
SbDee	SB >= 0.7 and PO + BW <= 0.2 and STK >= 0.6
SbSha	SB >= 0.7 and PO + BW <= 0.2
PjDee	PJ >= 0.7 and PO + BW <= 0.2 and STK >= 0.6
PjSha	PJ >= 0.7 and PO + BW <= 0.2
PoDee	PO >= 0.7 and STK >= 0.5
PoSha	PO >= 0.7
BwDom	BW >= 0.6 and BW + PO >= 0.7
OthHd	MH + UH +LH >= 0.3
SbMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and (SB + SW) > PJ
PjMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and PJ >= (SB + SW)
BfDom	BF >= 0.4 and BF + SW + SB + PJ >= 0.5
ConMx	PW + PR + SB + SW + BF + PJ + CE + LA >= 0.5
HrDom	PO + BW + MH + UH + LH + >= 0.7
HrdMw	PO + BW + MH + UH + LH + >= 0.5
Unknown	all

Table A-3. SFMMTool query descriptors for BNV Forest Units.

Forest Unit	Characteristics
PwDom	PW >= 0.4
PrDom	PR >= 0.7
PrwMx	PW + PR >= 0.4
OCLow	CE + LA >= 0.5 or WG = "Ce" or WG = "La" and PR + PW + PJ + SW + BW + < 0.1
SbLow	(SB + CE + LA >= 1 and (SC = "3" or SC = "4")) or (SB + CE + LA = 1 and CE + LA >= 0.1 and (vSC = "1" or SC = "2")
SbDee	SB >= 0.7 and PO + BW <= 0.2
PjDee	PJ >= 0.7 and PO + BW <= 0.2
PoDee	PO >= 0.7
BwDom	BW >= 0.6 and BW + PO >= 0.7
OthHd	MH + UH +LH >= 0.3
SbMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and (SB + SW) > PJ
PjMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and PJ >= (SB + SW)
BfDom	BF >= 0.4 and BF + SW + SB + PJ >= 0.5
ConMx	PW + PR + SB + SW + BF + PJ + CE + LA >= 0.5
HrDom	PO + BW + MH + UH + LH + >= 0.7
HrdMw	PO + BW + MH + UH + LH + >= 0.5
Unknown	all

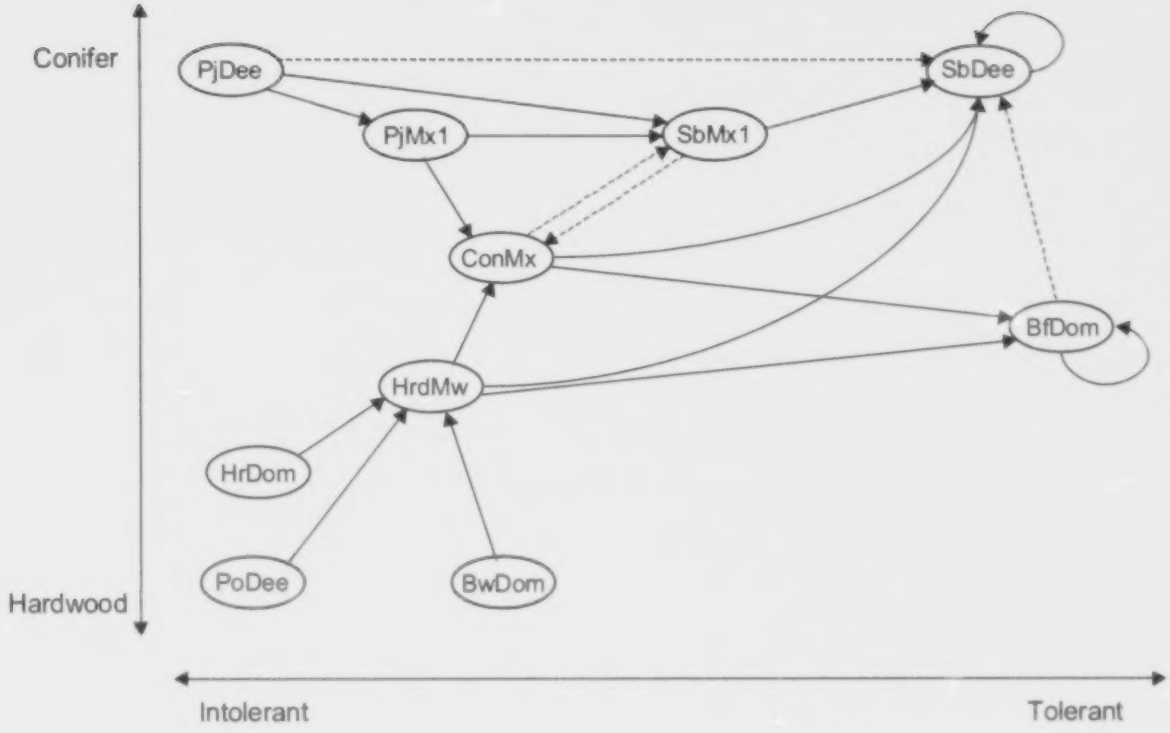
Table A-4. SFMMTool query descriptors for BNV Forest Units, including 'Shrub' forest unit.

Forest Unit	Characteristics
PwDom	PW >= 0.4
PrDom	PR >= 0.7
PrwMx	PW + PR >= 0.4
OCLow	CE + LA >= 0.5 or WG = "Ce" or WG = "La" and PR + PW + PJ + SW + BW + < 0.1
SbLow	(SB + CE + LA >= 1 and (SC = "3" or SC = "4")) or (SB + CE + LA = 1 and CE + LA >= 0.1 and (vSC = "1" or SC = "2")
SbDee	SB >= 0.7 and PO + BW <= 0.2
PjDee	PJ >= 0.7 and PO + BW <= 0.2
Shrub	PO >= 0.7 and STK > 0 and STK <= 0.3
PoDee	PO >= 0.7
Shrub	BW >= 0.6 and BW + PO >= 0.7 and stk > 0 AND stk <= 0.3
BwDom	BW >= 0.6 and BW + PO >= 0.7
OthHd	MH + UH +LH >= 0.3
Shrub	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and (SB + SW) > PJ and STK > 0 and STK <= 0.3
SbMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and (SB + SW) > PJ
PjMx1	PR + SB + PJ + SW + BF >= 0.7 and BF <= 0.1 and PO + BW <= 0.2 and PJ >= (SB + SW)
Shrub	BF >= 0.4 and BF + SW + SB + PJ >= 0.5 and STK > 0 and STK <= 0.3
BfDom	BF >= 0.4 and BF + SW + SB + PJ >= 0.5
Shrub	PW + PR + SB + SW + BF + PJ + CE + LA >= 0.5 and STK > 0 and STK <= 0.3
ConMx	PW + PR + SB + SW + BF + PJ + CE + LA >= 0.5
Shrub	PO + BW + MH + UH + LH >= 0.7 and STK > 0 and STK <= 0.3
HrDom	PO + BW + MH + UH + LH + >= 0.7
Shrub	PO + BW + MH + UH + LH >= 0.5 and STK > 0 and STK <= 0.3
HrdMw	PO + BW + MH + UH + LH + >= 0.5
Unknown	all

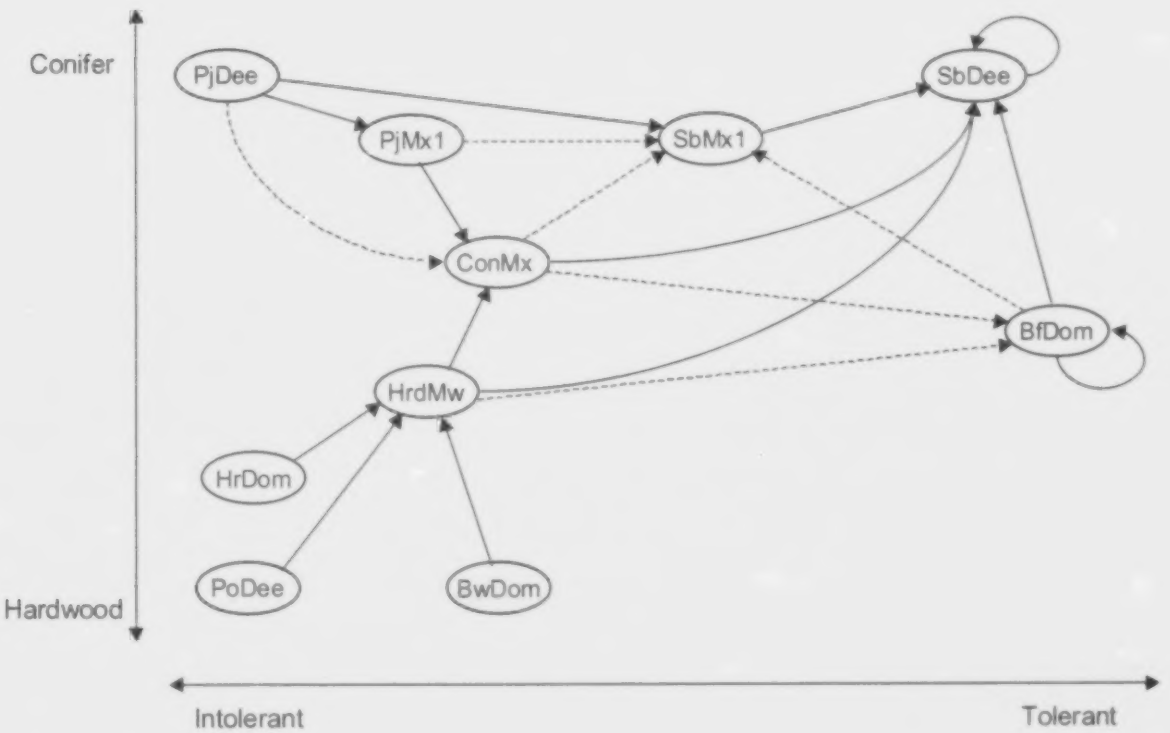
Appendix B

Professional Opinion – Calibrated Natural Succession Trends

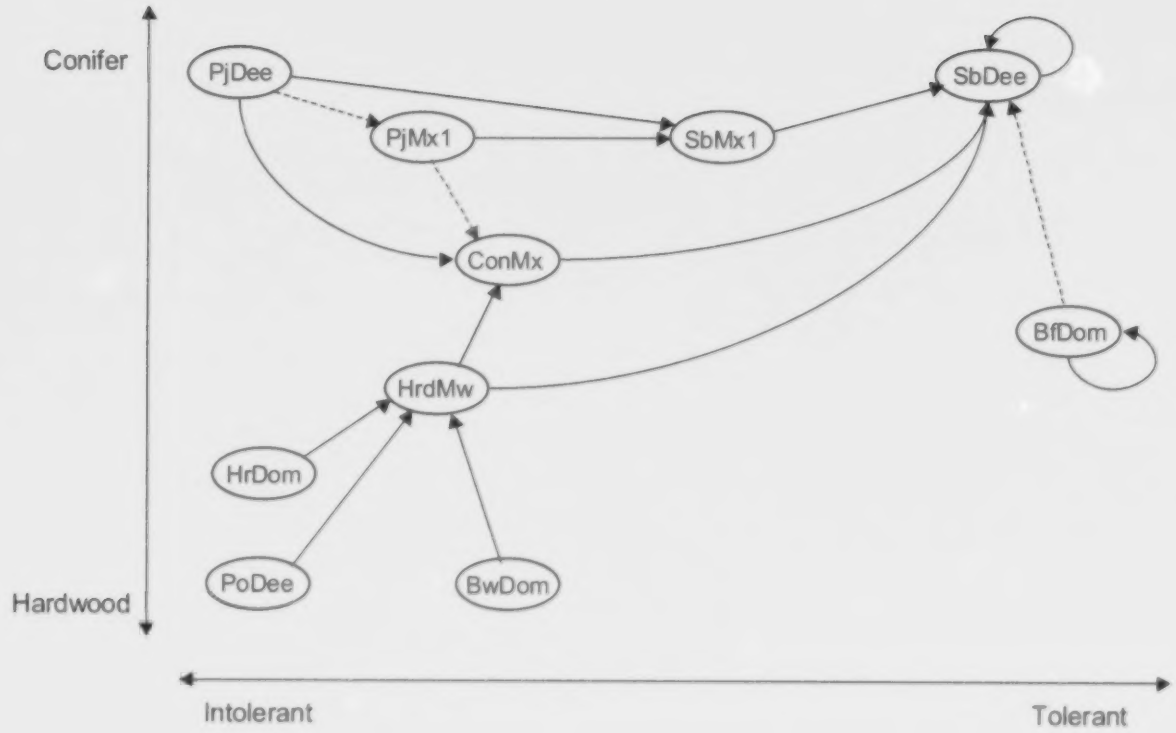
2W-2 Natural Succession Trends



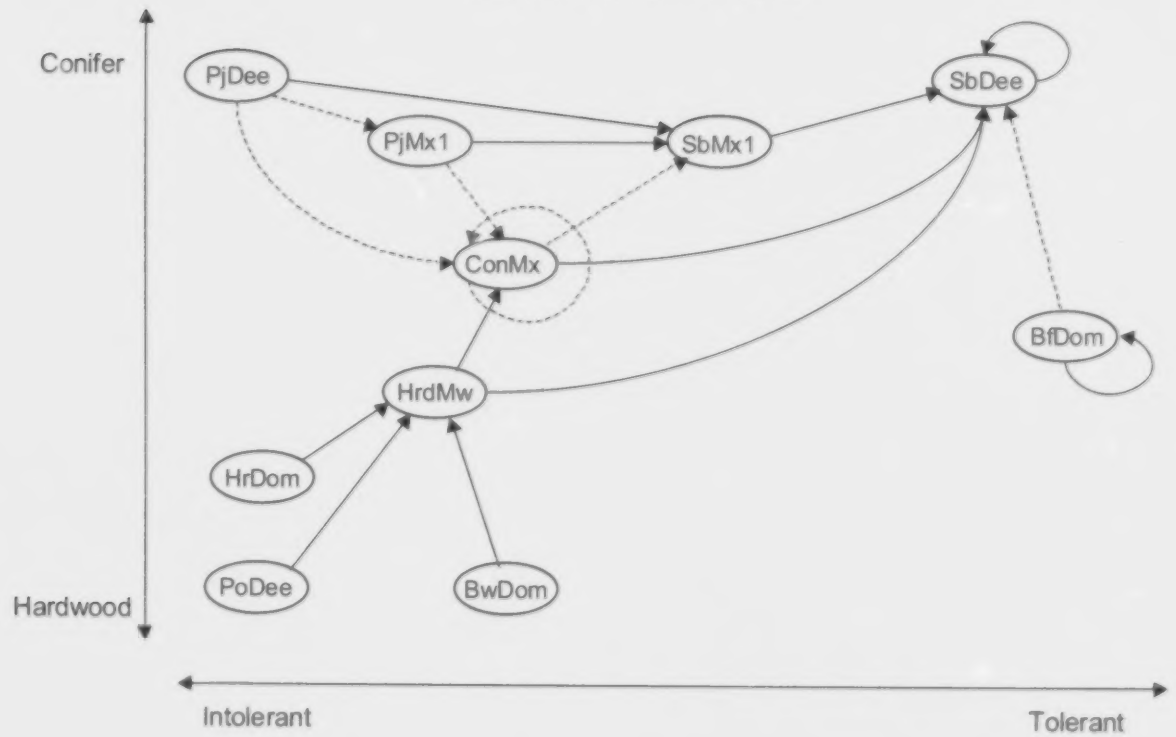
2W-3 Natural Succession Trends



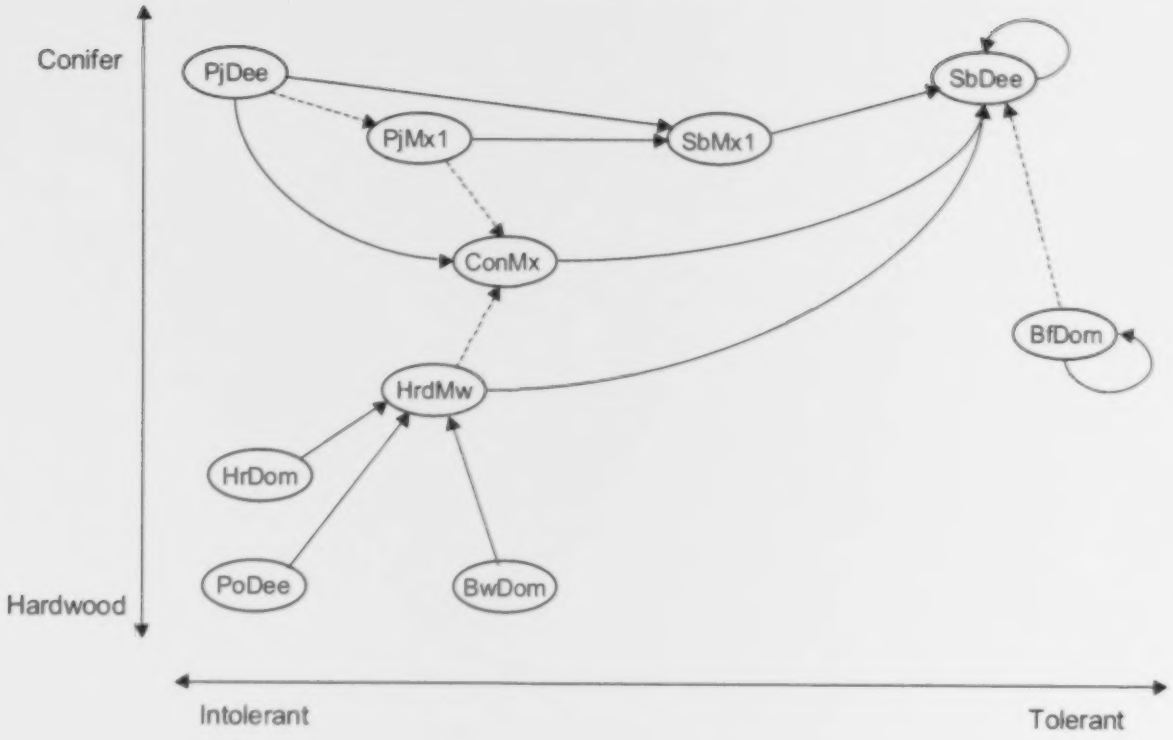
3S-1 Natural Succession Trends



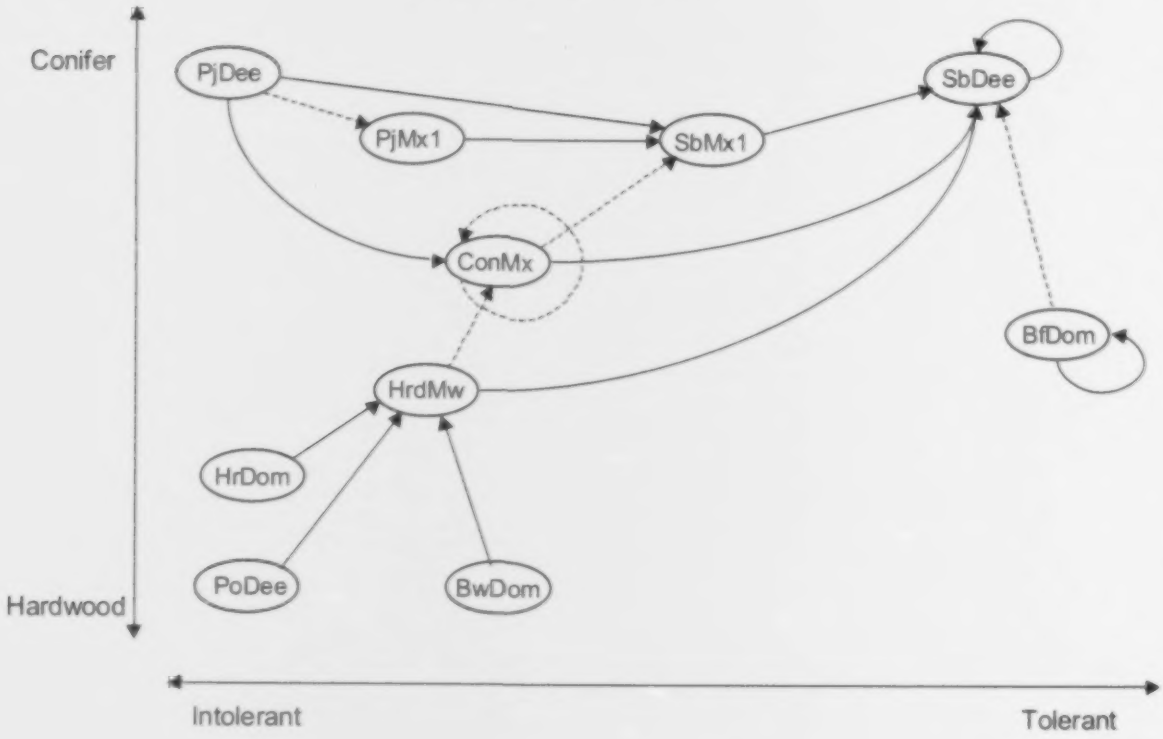
3S-2 Natural Succession Trends



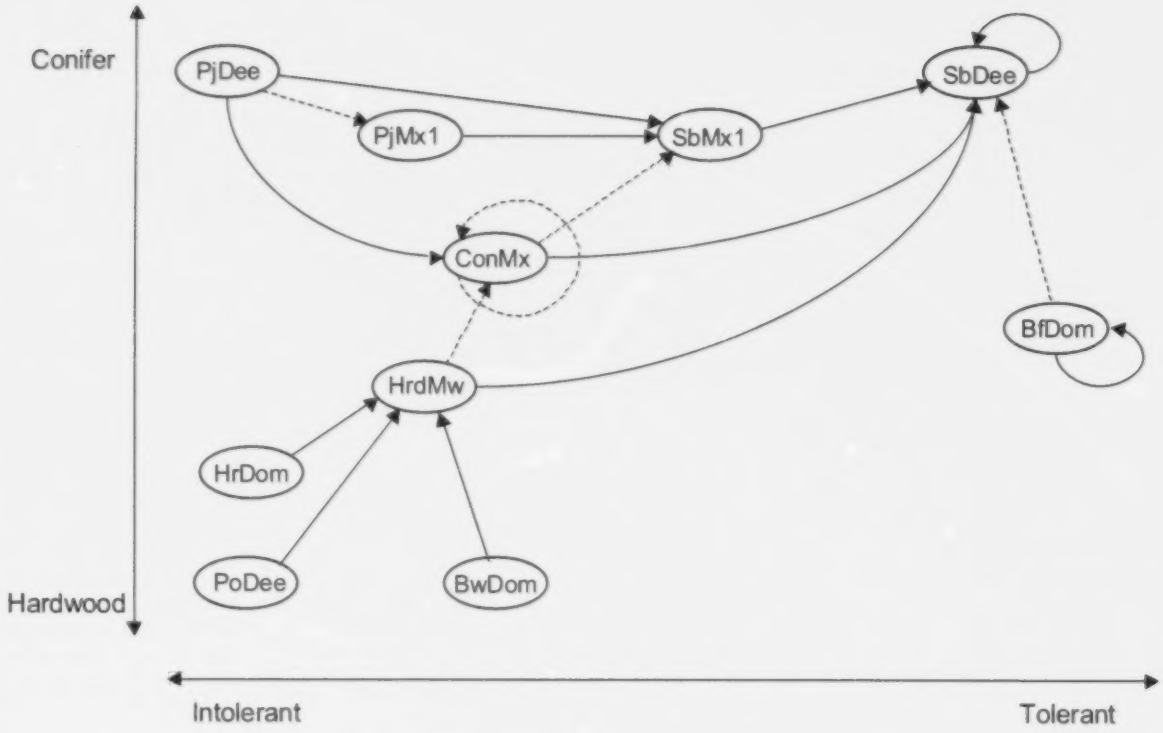
3S-3 Natural Succession Trends



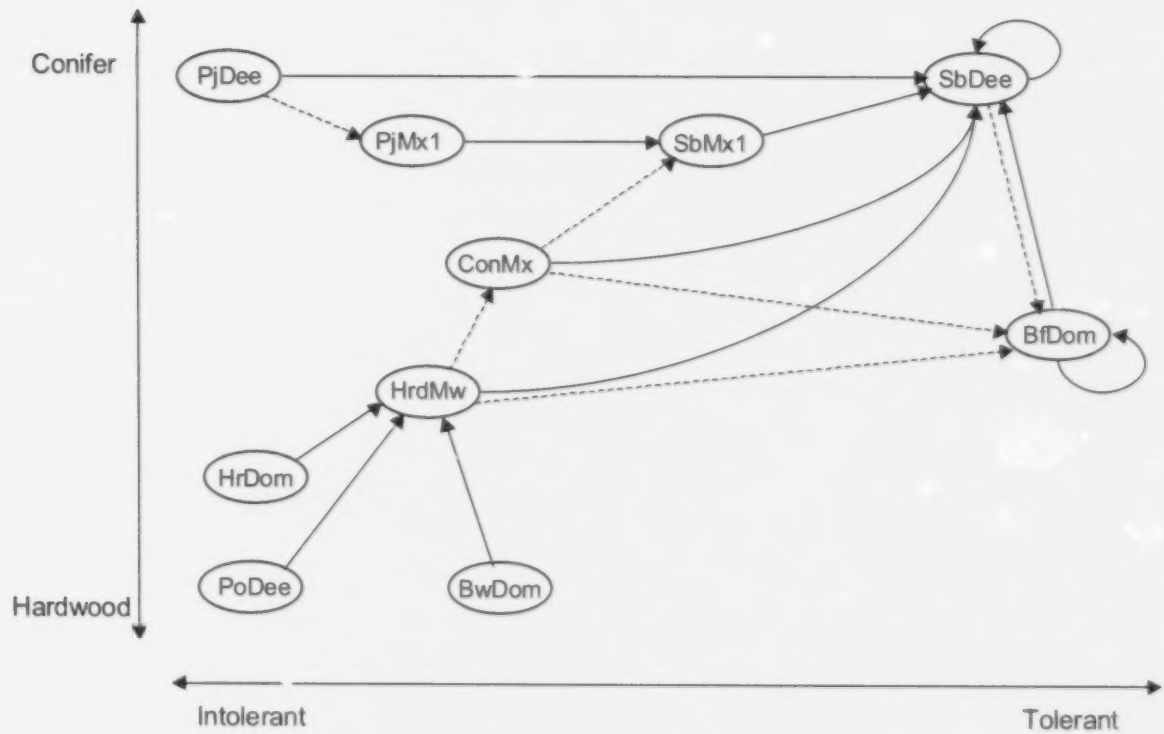
3S-4 Natural Succession Trends



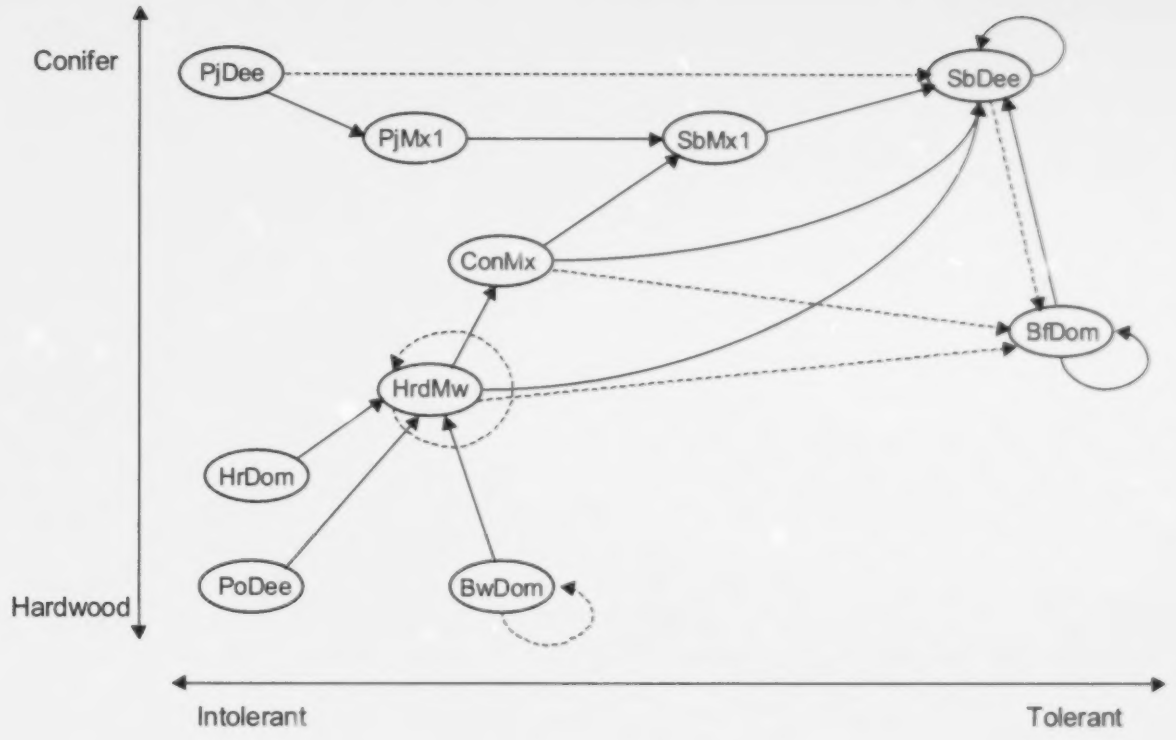
3S-5 Natural Succession Trends



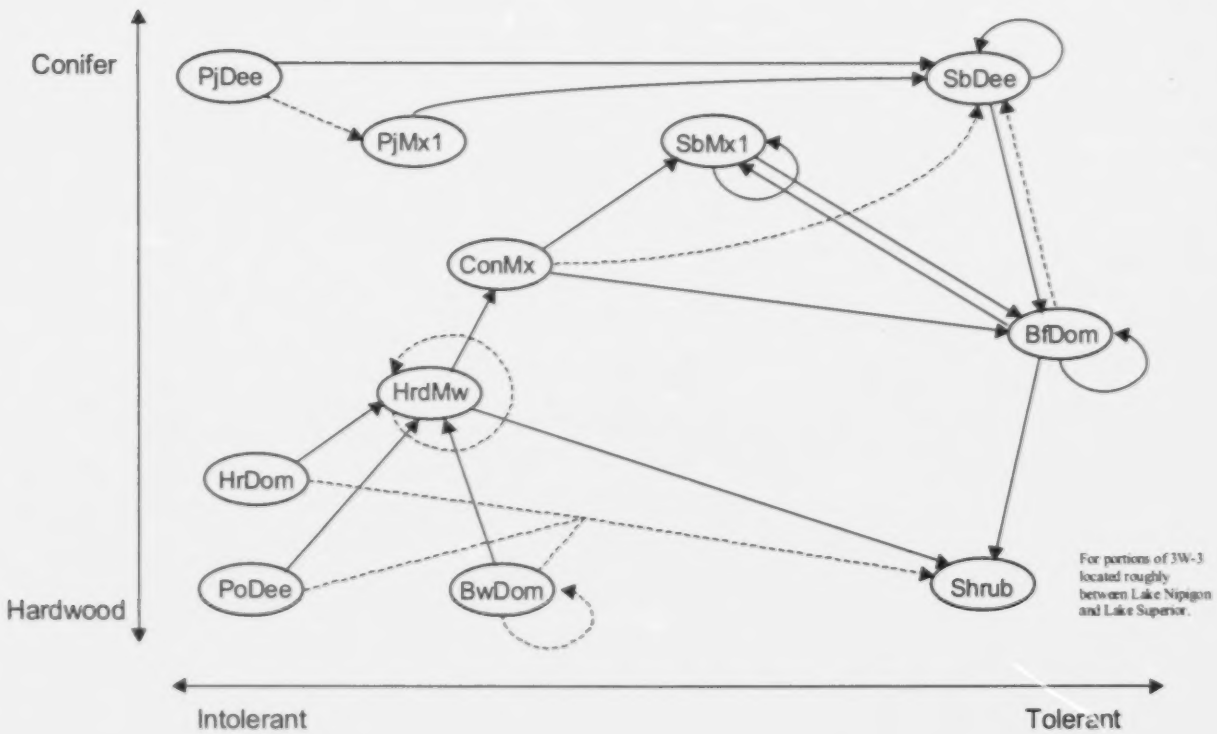
3W-1 Natural Succession Trends



3W-2 Natural Succession Trends

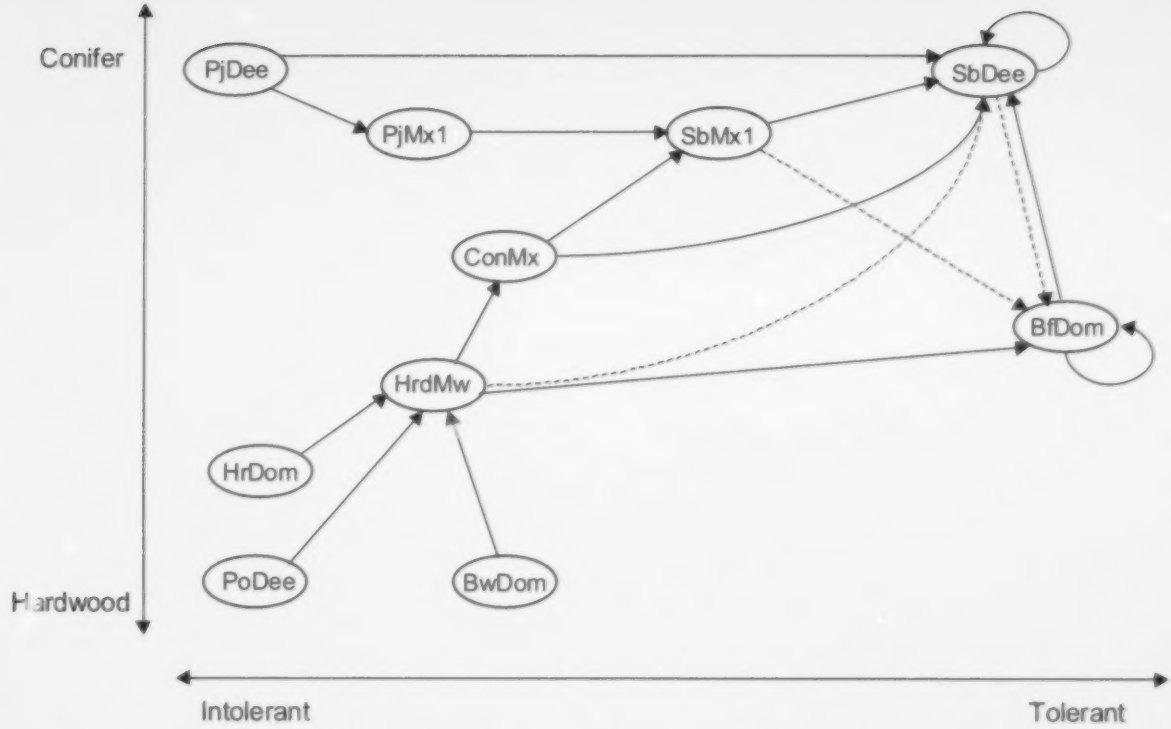


3W-3 Natural Succession Trends

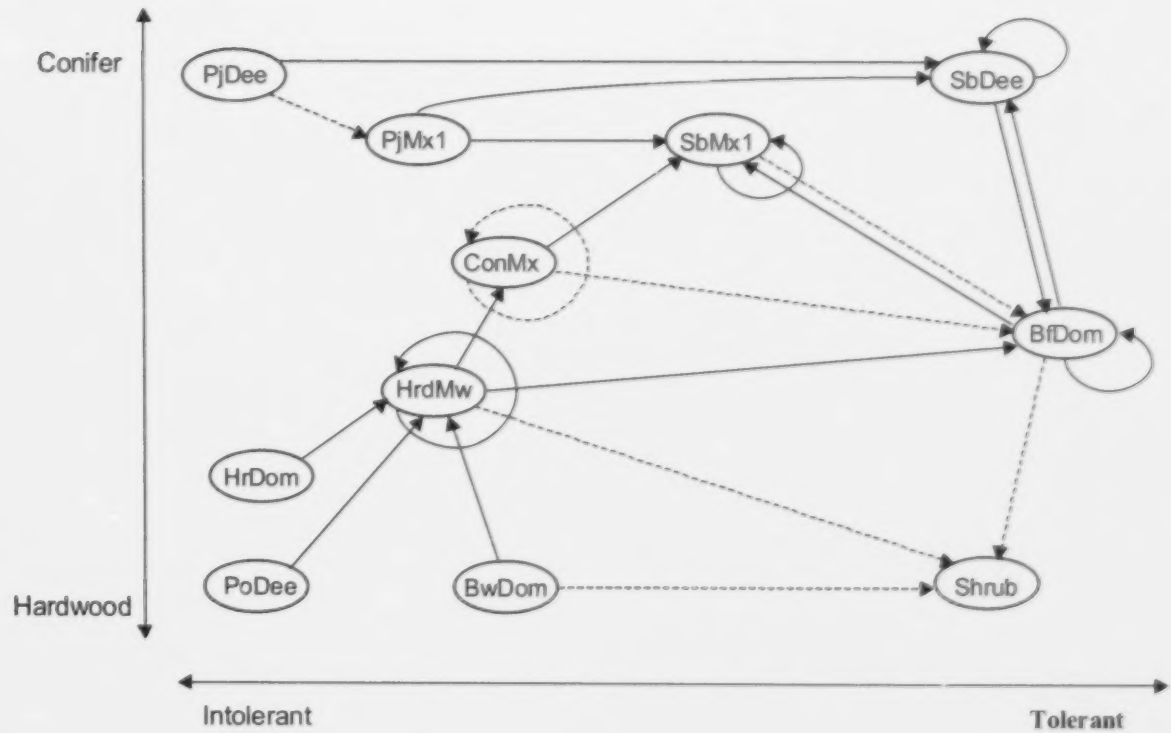


For portions of 3W-3 located roughly between Lake Nipigon and Lake Superior.

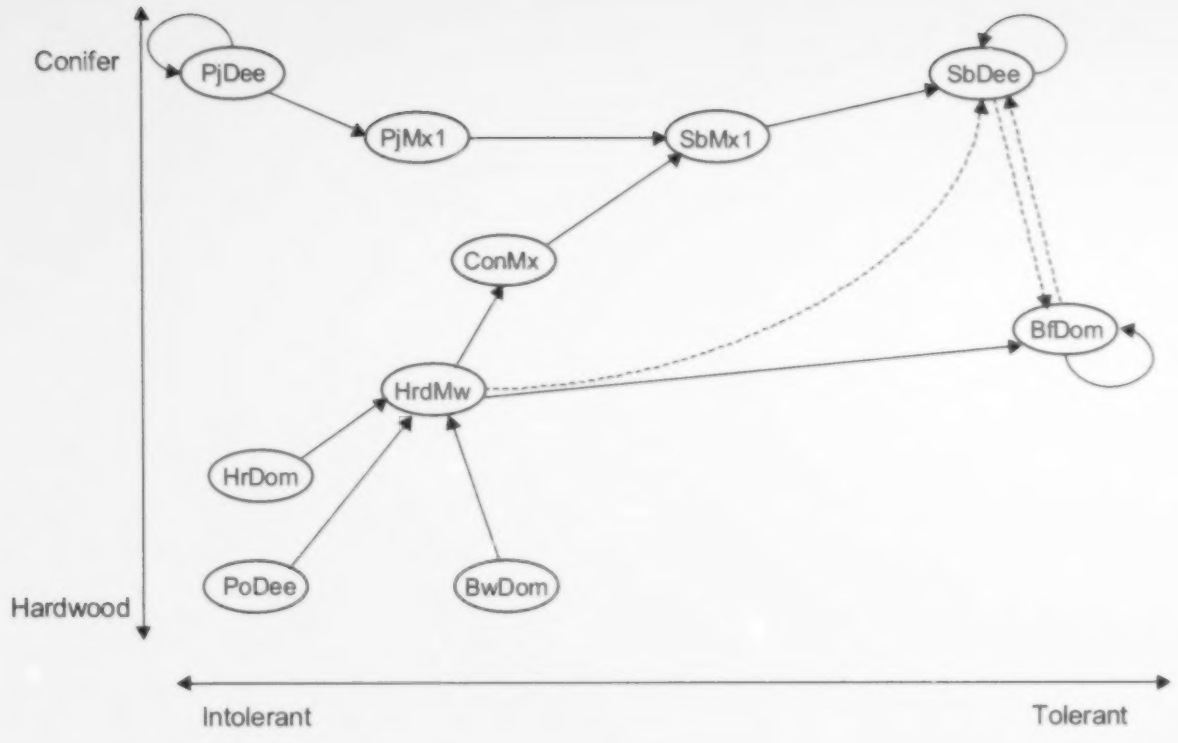
3W-4 Natural Succession Trends



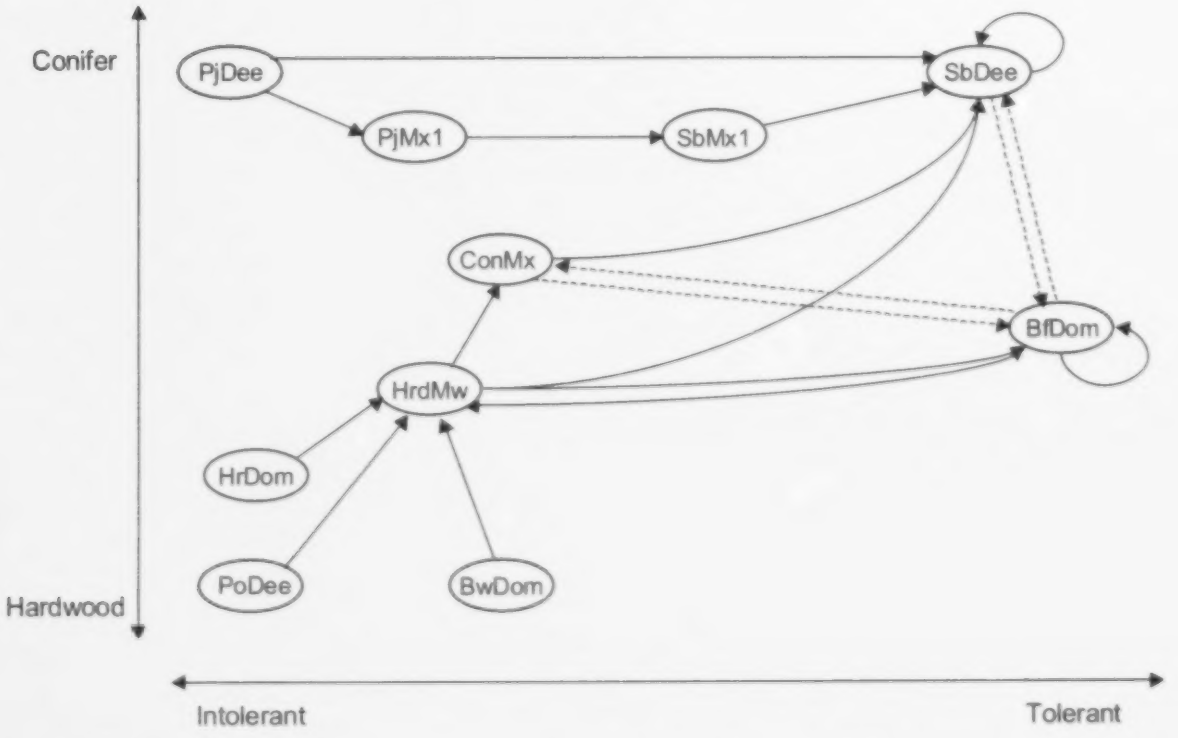
3W-5 Natural Succession Trends



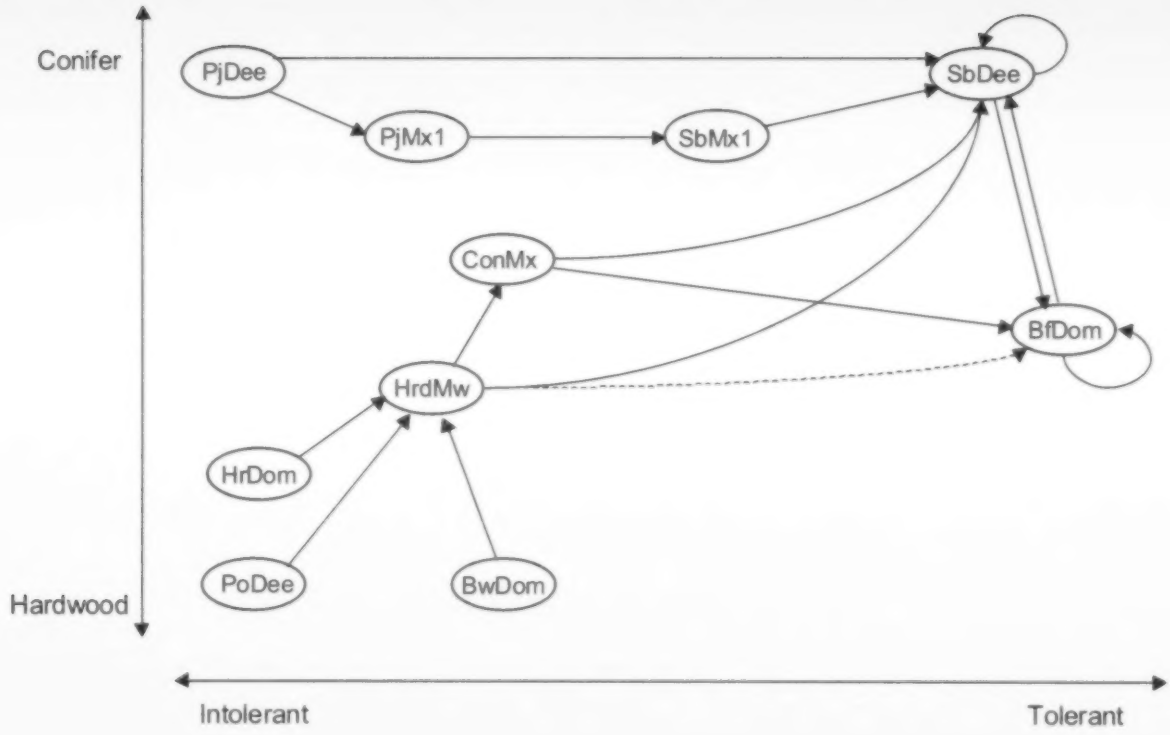
4S-1 Natural Succession Trends



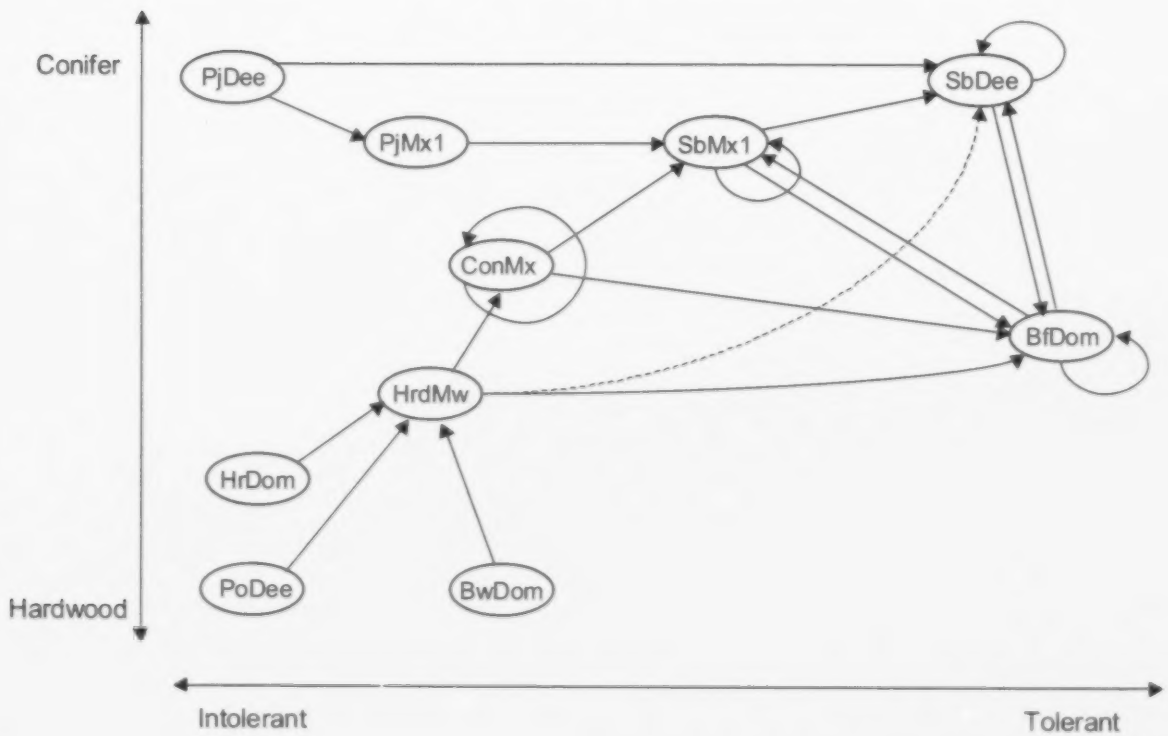
4S-2 Natural Succession Trends



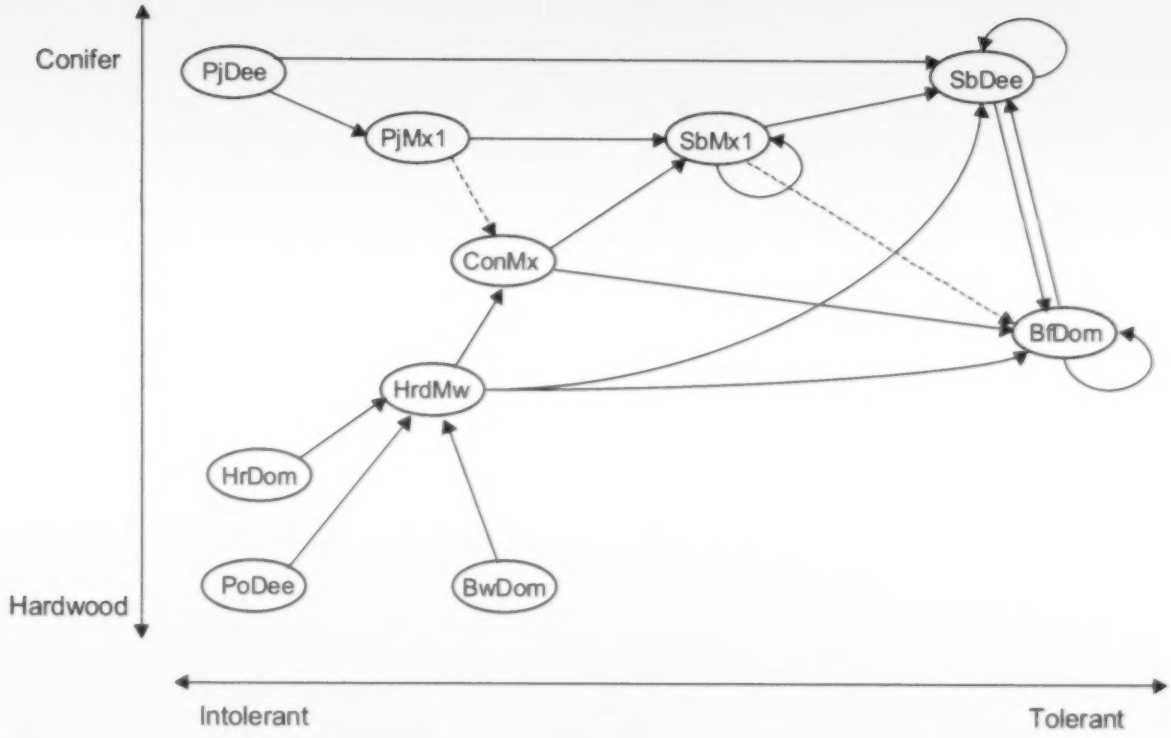
4S-3 Natural Succession Trends



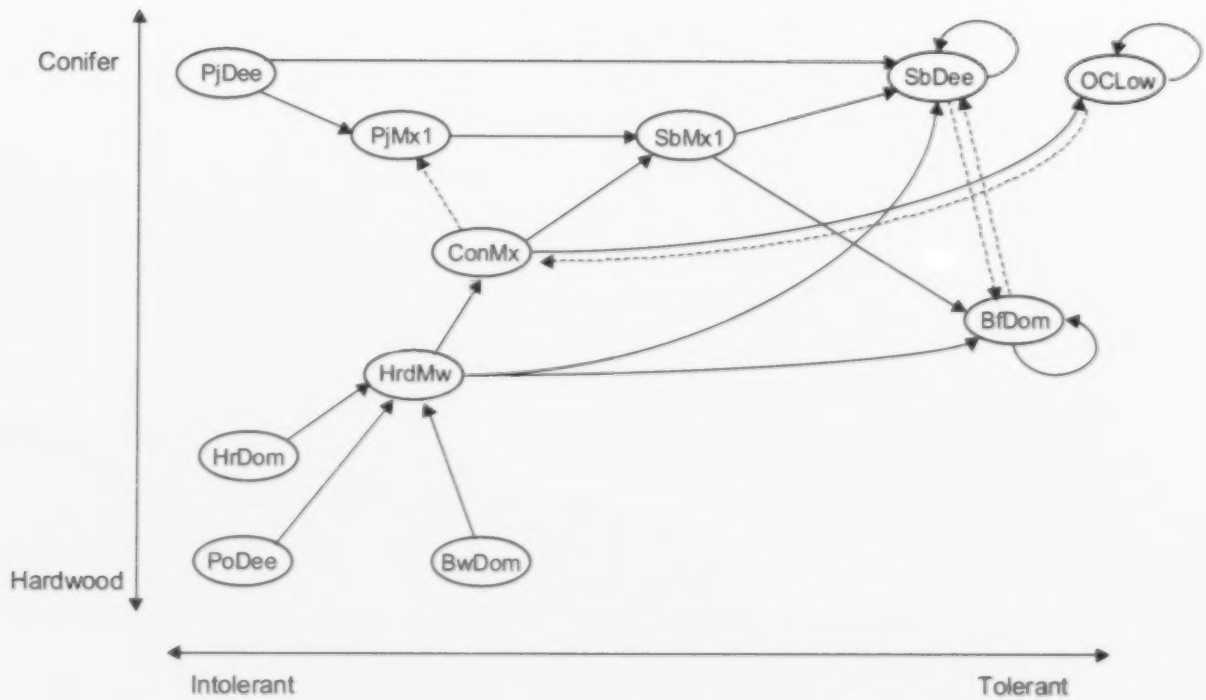
4S-4 Natural Succession Trends



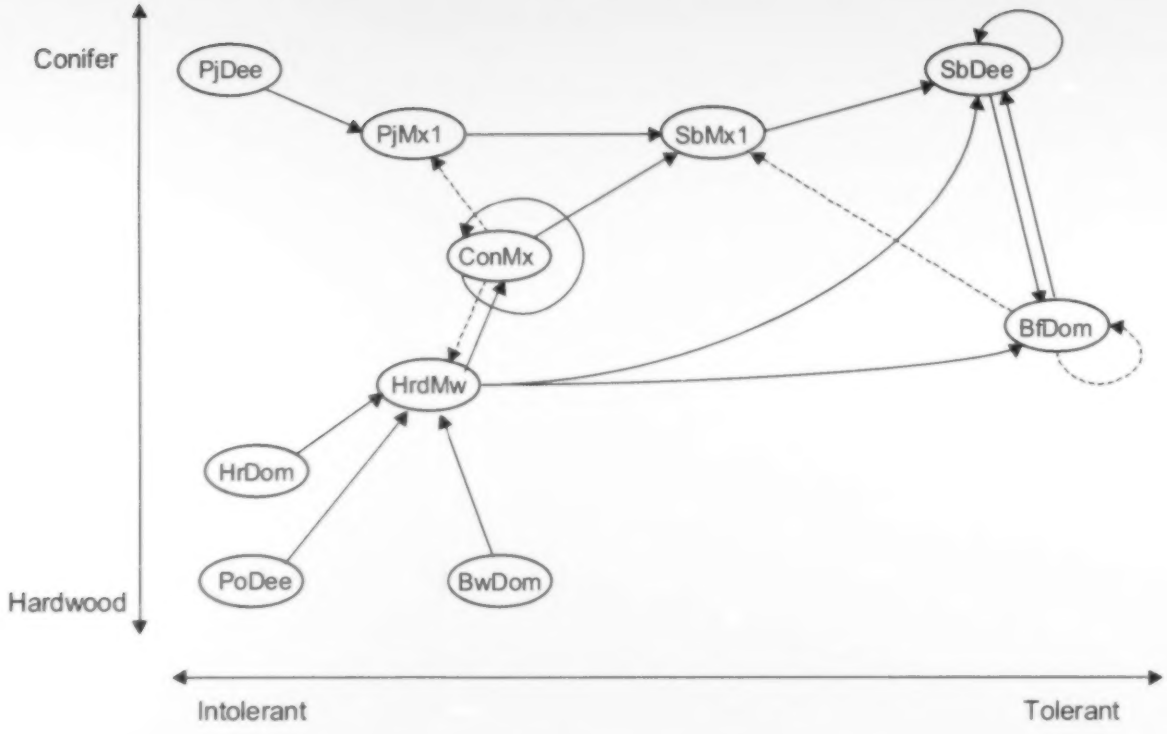
4S-5 Natural Succession Trends



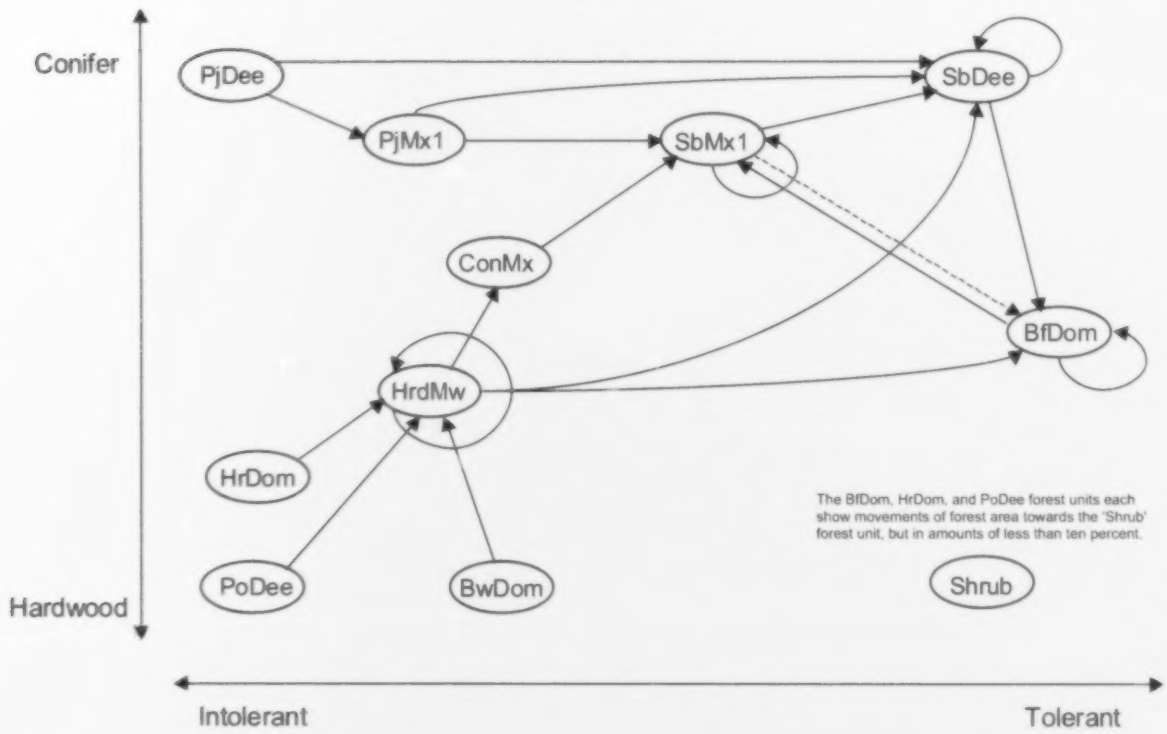
4S-6 Natural Succession Trends



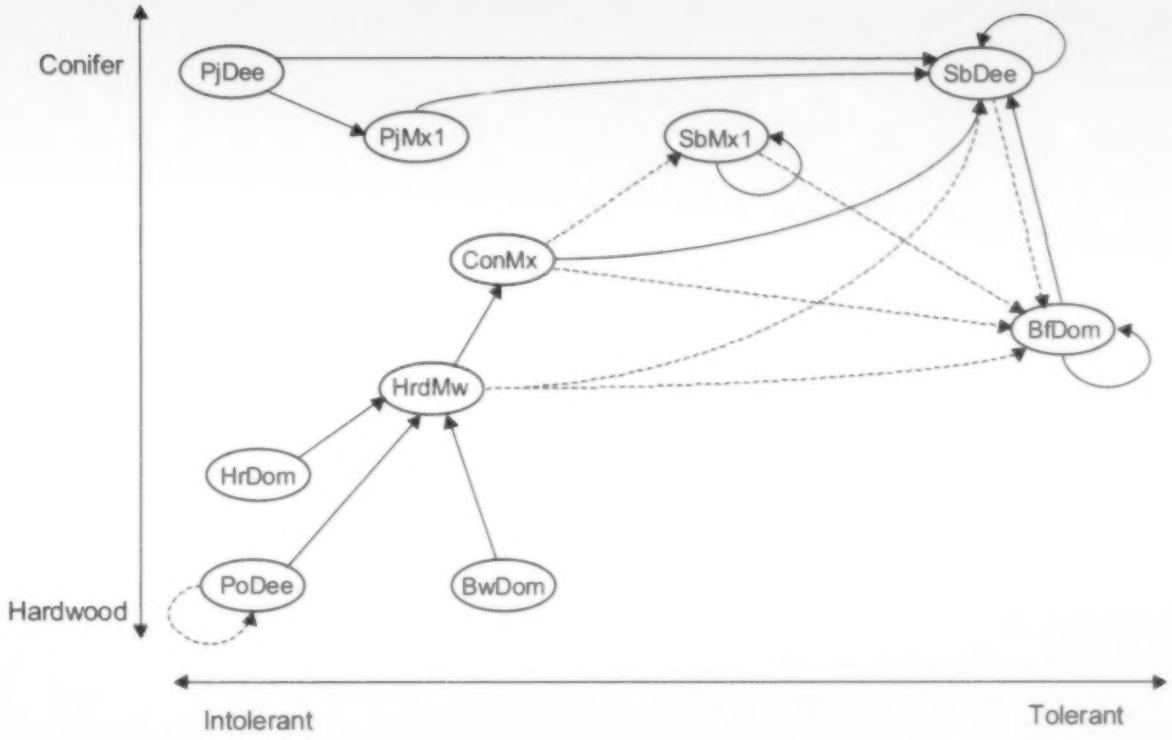
4W-1 Natural Succession Trends



4W-2 Natural Succession Trends



5S-2 Natural Succession Trends



NOTE:

Solid lines on the above charts indicate that strong successional trends are believed to exist; ranging between a 30 percent to 100 percent movement of forest unit area.

Dotted lines indicate that small but noticable successional trends are believed to exist, ranging between a 10 percent to 29 percent movement of forest unit area.

Appendix C

Post-fire Succession Trends

2W-2

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.12	0.06										0.7		0.12
BwDom		1														
ConMx			0.15	0.27	0.11				0.06					0.33		0.08
HrdMw			0.18	0.16	0.18					0.46				0.02		
HrDom		0.04	0.04	0.05	0.12					0.75						
OCLow						1										
OthHd							1									
PjDee			0.08					0.7	0.22							
PjMx1			0.15					0.5	0.3							0.05
PoDee					0.03					0.97						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.01											0.94		0.05
SbLow															1	
SbMx1			0.04	0.01					0.25					0.45		0.25

2W-3

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.18	0.12										0.59		0.11
BwDom		0.77	0.03	0.2												
ConMx			0.2	0.16	0.09			0.03	0.18					0.14		0.2
HrdMw		0.03	0.2	0.17	0.23			0.01		0.35				0.01		
HrDom		0.05	0.05	0.09	0.14					0.67						
OCLow						1										
OthHd							0.8								0.2	
PjDee			0.02					0.88	0.1							
PjMx1			0.01					0.6	0.35							0.04
PoDee					0.04					0.96						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.03											0.91		0.06
SbLow															1	
SbMx1			0.05	0.02				0.08	0.42					0.18		0.25

3S-1

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.2						0.2					0.25		0.35
BwDom		0.7	0.05	0.1	0.15											
ConMx			0.15	0.18				0.08	0.42							0.17
HrdMw		0.06	0.16	0.05	0.25				0.05	0.43						
HrDom		0.08	0.11	0.09	0.1					0.62						
OCLow						1										
OthHd							1									
PjDee			0.04					0.94	0.02							
PjMx1			0.1					0.7	0.18							0.02
PoDee					0.07					0.93						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.06					0.04	0.07					0.68		0.15
SbLow															1	
SbMx1			0.14					0.08	0.38					0.2		0.2

3S-2

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.15	0.13				0.02	0.15					0.3		0.25
BwDom		0.76	0.02	0.11	0.11											
ConMx			0.17	0.18	0.1			0.07	0.33							0.15
HrdMw		0.06	0.12	0.05	0.25					0.52						
HrDom		0.05	0.16	0.11	0.07					0.61						
OCLow						1										
OthHd							0.9							0.1		
PjDee								0.96	0.04							
PjMx1			0.08					0.72	0.11							0.09
PoDee			0.07	0.04						0.89						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee								0.03	0.06					0.79		0.12
SbLow															1	
SbMx1			0.14	0.02					0.37					0.21		0.26

3S-3

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.03	0.3	0.38	0.05					0.05				0.05		0.14
BwDom		0.75	0.14	0.06	0.05											
ConMx			0.18	0.1	0.05				0.39					0.04		0.24
HrdMw		0.35	0.15	0.05	0.35					0.1						
HrDom		0.05	0.1	0.07	0.18					0.6						
OCLow						1										
OthHd							1									
PjDee			0.03					0.92	0.05							
PjMx1			0.07					0.6	0.28							0.05
PoDee			0.02	0.03	0.05					0.9						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.05					0.01	0.04					0.81		0.09
SbLow															1	
SbMx1			0.1						0.35					0.2		0.35

3S-4

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.35	0.1										0.52		0.03
BwDom		0.7	0.12	0.05	0.1					0.03						
ConMx			0.3	0.09	0.18				0.15					0.1		0.18
HrdMw		0.03	0.22	0.1	0.32					0.33						
HrDom		0.06	0.11	0.12	0.15					0.56						
OCLow						1										
OthHd							1									
PjDee			0.01					0.9	0.06							0.03
PjMx1			0.03					0.75	0.18							0.04
PoDee				0.02	0.04					0.94						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee								0.01	0.04					0.85		0.1
SbLow															1	
SbMx1			0.04	0.03				0.08	0.42					0.18		0.25

3S-5

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.23	0.16	0								0.41			0.2
BwDom		0.68	0.04	0.12	0.16											
ConMx			0.21	0.16	0.23				0.2							0.2
HrdMw			0.25	0.11	0.4				0.01	0.22						0.01
HrDom			0.14	0.19	0.25					0.42						
OCLow						1										
OthHd							1									
PjDee			0.03					0.85	0.12							
PjMx1			0.06	0.03				0.62	0.14							0.15
PoDee				0.06	0.1					0.84						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.03					0.04	0.07					0.69		0.17
SbLow															1	
SbMx1			0.28	0.02					0.17					0.23		0.3

3W-1

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.2	0.2	0.07				0.05	0.06				0.1		0.3
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05			0.02	0.28	0.02				0.05		0.23
HrdMw		0.02	0.12	0.15	0.28				0.05	0.28						0.1
HrDom		0.05	0.04	0.1	0.24					0.57						
OCLow						1										
OthHd							0.9								0.1	
PjDee			0.02					0.9	0.08							
PjMx1			0.02					0.6	0.35							0.03
PoDee					0.07					0.93						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee									0.12					0.8		0.08
SbLow															1	
SbMx1			0.09	0.02				0.08	0.46					0.15		0.2

3W-2

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.2	0.2	0.07				0.05	0.06				0.1		0.3
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.15	0.33				0.05	0.35						0.1
HrDom		0.05		0.1	0.5					0.35						
OCLow						1										
OthHd							1									
PjDee								0.95	0.05							
PjMx1				0.02				0.6	0.35							0.03
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

3W-3

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1	Shrub
BfDom		0.02	0.2	0.2	0.07				0.05	0.06				0.1		0.3	
BwDom		0.8		0.15	0.05												
ConMx			0.2	0.15	0.05				0.25	0.07				0.05		0.2	
HrdMw		0.02		0.15	0.33				0.05	0.35						0.1	
HrDom		0.05		0.1	0.5					0.35							
OCLow						1											
OthHd							1										
PjDee								0.95	0.05								
PjMx1			0.08	0.02				0.6	0.27								
PoDee										1							
PrDom											1						
PrwMx												1					
PwDom													1				
SbDee			0.15					0.02	0.08					0.5		0.3	
SbLow															1		
SbMx1			0.15	0.01				0.25	0.26					0.07		0.3	
Shrub		0.06	0.1	0.16	0.1					0.15				0.37		0.1	

3W-4

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.2	0.2	0.07				0.05	0.06				0.1		0.3
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.15	0.33				0.06	0.34						0.1
HrDom		0.05		0.1	0.5					0.35						
OCLow						1										
OthHd							1									
PjDee								0.95	0.05							
PjMx1				0.02	0.01			0.59	0.34	0.01						0.03
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

3W-5

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1	Shrub
BfDom			0.2	0.2	0.07				0.05	0.06				0.1		0.3	
BwDom		1		0.05													
ConMx		0.2	0.25	0.05	0.05				0.2	0.02				0.1		0.2	
HrdMw				0.15	0.33				0.06	0.34						0.1	
HrDom		0.1		0.1	0.5					0.35							
OCLow						1											
OthHd							1										
PjDee								1	0.05								
PjMx1				0.03	0.01			0.6	0.33	0.01							
PoDee										1							
PrDom											1						
PrwMx												1					
PwDom													1				
SbDee			0.1					0.1	0.23					0.5		0.2	
SbLow															1		
SbMx1			0.09	0.01				0.2	0.2					0.2		0.4	
Shrub			0.02	0.04	0.1				0.02	0.15				0.4		0.3	

4S-1

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.15	0.15	0.07			0.1	0.15	0.06				0.1		0.2
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.1	0.13				0.05	0.6						0.1
HrDom		0.05		0.1	0.17					0.68						
OCLow						1										
OthHd							1									
PjDee								0.95	0.05							
PjMx1				0.02				0.6	0.35							0.03
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4S-2

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.15	0.15	0.07			0.1	0.15	0.06				0.1		0.2
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.1	0.13				0.05	0.6						0.1
HrDom		0.05		0.1	0.17					0.68						
OCLow						1										
OthHd							1									
PjDee								0.95	0.05							
PjMx1				0.02				0.6	0.35							0.03
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4S-3

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.1	0.15	0.07			0.1	0.15	0.06				0.1		0.25
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.15	0.33				0.05	0.35						0.1
HrDom		0.05		0.1	0.5					0.35						
OCLow						1										
OthHd							1									
PjDee								0.7	0.05					0.15		0.1
PjMx1				0.02				0.5	0.3					0.08		0.1
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4S-4

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.1	0.15	0.07			0.1	0.15	0.06				0.1		0.25
BwDom		0.8		0.15	0.05											
ConMx			0.2	0.15	0.05				0.3	0.02				0.05		0.23
HrdMw		0.02		0.15	0.33				0.05	0.35						0.1
HrDom		0.05		0.1	0.5					0.35						
OCLow						1										
OthHd							1									
PjDee								0.73	0.07					0.12		0.08
PjMx1				0.02				0.5	0.33					0.05		0.1
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.02	0.08					0.5		0.25
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4S-5

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.1	0.15	0.07			0.1	0.15	0.06				0.1		0.25
BwDom		0.8		0.15	0.05											
ConMx			0.05	0.15	0.12				0.3	0.1				0.05		0.23
HrdMw		0.02		0.15	0.33				0.05	0.35						0.1
HrDom		0.05		0.1	0.5					0.35						
OCLow						1										
OthHd							1									
PjDee								0.95	0.05							
PjMx1				0.02				0.6	0.35							0.03
PoDee										1						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.15					0.13	0.25					0.2		0.27
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4S-6

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.2	0.2	0.07				0.05	0.06				0.1		0.3
BwDom		0.83		0.12	0.05											
ConMx			0.05	0.15	0.15				0.3	0.07				0.05		0.23
HrdMw		0.02		0.3	0.31				0.05	0.22						0.1
HrDom		0.08		0.09	0.19					0.64						
OCLow						1										
OthHd				0.07	0.07		0.8			0.03						
PjDee								0.95	0.05							
PjMx1			0.1	0.02				0.6	0.25							0.03
PoDee				0.05	0.02					0.93						
PrDom											1					
PrwMx											0.1	0.8	0.1			
PwDom				0.01									1			
SbDee			0.15					0.13	0.25					0.2		0.27
SbLow															1	
SbMx1			0.1	0.01				0.25	0.31					0.07		0.26

4W-1

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.8	0.1												0.1
BwDom		0.8		0.2												
ConMx			0.2	0.16	0.09			0.04	0.26	0.02				0.05		0.18
HrdMw		0.05	0.1	0.15	0.3					0.4						
HrDom			0.08	0.1	0.2					0.62						
OCLow						1										
OthHd							1									
PjDee			0.05					0.9	0.05							
PjMx1			0.05	0.05				0.6	0.3							
PoDee				0.05	0.05					0.9						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.1					0.05	0.25					0.25		0.35
SbLow															1	
SbMx1								0.18	0.51					0.1		0.21

4W-1

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom			0.8	0.1												0.1
BwDom		0.8		0.2												
ConMx			0.2	0.16	0.09			0.04	0.26	0.02				0.05		0.18
HrdMw		0.05	0.1	0.15	0.3					0.4						
HrDom			0.08	0.1	0.2					0.62						
OCLow						1										
OthHd							1									
PjDee			0.05					0.9	0.05							
PjMx1			0.05	0.05				0.6	0.3							
PoDee				0.05	0.05					0.9						
PrDom											1					
PrwMx												1				
PwDom													1			
SbDee			0.1					0.05	0.25					0.25		0.35
SbLow															1	
SbMx1								0.18	0.51					0.1		0.21

5S-2

From \ To	BfDom	BwDom	ConMx	HrdMw	HrDom	OCLow	OthHd	PjDee	PjMx1	PoDee	PrDom	PrwMx	PwDom	SbDee	SbLow	SbMx1
BfDom		0.02	0.12	0.14	0.11				0.04	0.47						0.1
BwDom		0.78		0.06	0.12					0.04						
ConMx			0.06	0.1	0.07			0.06	0.27	0.3				0.04		0.1
HrdMw		0.01		0.05	0.2				0.07	0.63						0.04
HrDom		0.02		0.1	0.1					0.75						0.03
OCLow						1										
OthHd					0.15		0.8			0.05						
PjDee								0.97	0.03							
PjMx1			0.1	0.02				0.7	0.17							0.01
PoDee				0.02						0.98						
PrDom											1					
PrwMx											0.1	0.9				
PwDom				0.01									1			
SbDee			0.1					0.08	0.15					0.51		0.16
SbLow															1	
SbMx1			0.1	0.01				0.07	0.15					0.1		0.57

Appendix D

BNV Project Fire Regimes

The determination of natural fire regimes for Ontario's landscape is a difficult undertaking, and one that may be impossible to realize. The main difficulty lies in the desire to differentiate between the fire regimes of pre-suppression and post-suppression eras. Fire records from before the second World War were sparse, and anecdotal. Fire maps were not accurate, and did not capture all fires that occurred. Furthermore, fires smaller than 200 hectares were not included in this database, as mapping such fires would have been difficult since they likely represent 75 percent of the fires that occur on the land base. While fires less than 200 hectares in size are relatively small as compared to those included in the atlas, their combined areas can be expected to have some influence on a landscapes fire cycle.

Bridge (2001) claimed no measurable difference in fire cycles existed between the pre-suppression and post-suppression eras. We conducted a similar analysis as Bridge (2001) using data from Ontario's Digital Fire Atlas (Perera *et al.* 1998) and did find changes in fire cycles which clearly identified pre and post suppression eras. This analysis involves plotting the cumulative proportion of total burned areas on a logarithmic scale through time. Regression analysis was applied to this data. Consistent slope indicates a consistent fire cycle. Breaks in the slope indicate a change in the fire cycle.

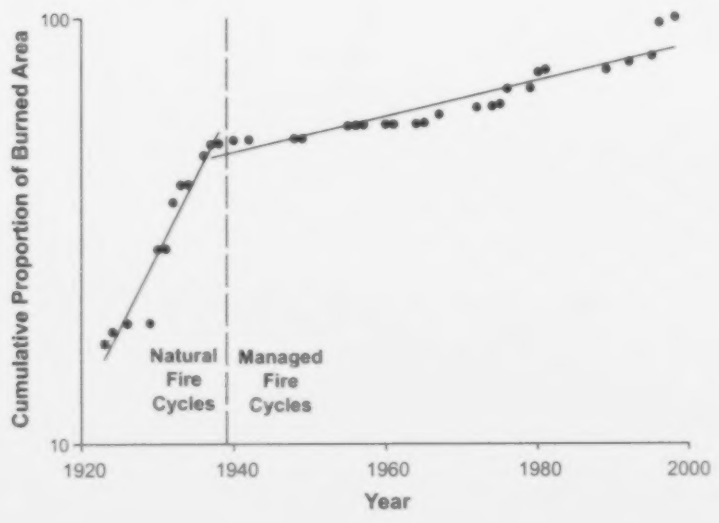


Figure D1. Regression of cumulative proportion of burned area from 1920 to 2000 showing hypothesized 1920 to 1939 natural fire cycles and hypothesized 1939 to 2000 managed fire cycles.

The upper and lower fire cycle estimates provided below in Table D-1 are not meant to be definitive values identifying the full extremes that the landscapes may experience, but provide a reasonable range in fire cycles within which forest management and planning might occur.

For the purposes of understanding our analysis the following example documenetation is provided pending completion of the methodology report.

Table D-1. High and low (upper and lower) fire cycle estimations by ecodistrict for northwestern Ontario.

Ecodistrict	Estimated Fire Cycle Limits	
	Low	High
2W-1	100	350
2W-3	90	350
3S-1	40	110
3S-2	40	125
3S-3	70	135
3S-4	90	250
3S-5	50	125
3W-1	65	250
3W-2	50	160
3W-3	60	210
3W-4	65	210
3W-5	90	300
4S-1	40	110
4S-2	55	250
4S-3	55	210
4S-4	65	250
4S-5	50	160
4S-6	45	160
4W-1	50	210
4W-2	90	300
5S-2	45	250

Fire Cycle Estimations

Using a Geographical Information System, fires by decade were overlain on the regional land base. They were then stratified by ecoregion and ecodistrict. Fire polygons spanning more than one ecodistrict were split along the ecodistrict border, and the areas for the new polygons calculated. Fire cycles were determined for each ecodistrict, accounting for land base reductions due to lakes and rivers.

Cumulative estimates of fire cycles were made by determining the fire cycle for a single year, for the earliest recorded fire available. Areas burned in the subsequent year of recorded fire activity were summed with those of the previous period(s), and the average fire cycle was estimated, by dividing the "area of the total land base" by the newly derived "average annual area burned" (Figure D-2).

Once the cumulative estimated fire cycles have been determined they were plotted through time and represented on a graph similar to that demonstrated below (Figure D-3).

Using the point-in-time identified by the fire frequency analysis as a cut-off for determining the natural fire cycle extremes, the longest fire cycle recorded is then considered to be the estimated upper bound of natural fire cycle variation, and the lowest recorded fire cycle is considered to be the estimated lower bound of natural fire cycle variation. In the example (Figure D-3), these bounds were found to be 324 and 73 years respectively. As the time period is short and the long-term impact of fire cycles is great this is consdidered a rough approximation of fire cycles. Also, it is generally considered to be a conservative estimate.

Ex. 1	$C_{(1931)}$	=(T / (A / X))	**Ex. 2**	$C_{(1936)}$	=(T / ((A+B) / X))
(Y = 1931)		= (1000 / (10 / 1))	**(Y = 1936)**		= (1000 / ((10 + 20) / 6))
(X = 1 year)		= (1000 / 10)	**(X = 6 years)**		= (1000 / (30 / 6))
	$C_{(1931)}$	= 100			= (1000 / 5)
				$C_{(1936)}$	= 200

Where: $C_{(y)}$ = Cumulative estimated fire cycle for year in question
T = Total land base area (1000 hectares)
A = area burned in 1931 - first recorded year of fire activity (10 ha.)
B = Area burned in 1936 - next recorded year of fire activity (20 ha.)
X = Number of years since first recorded year of fire activity
Y = Year in question

Note: No fires occurred in 1932 - 1935

Figure D-2. Example illustrating the process of establishing cumulative estimating fire cycles.

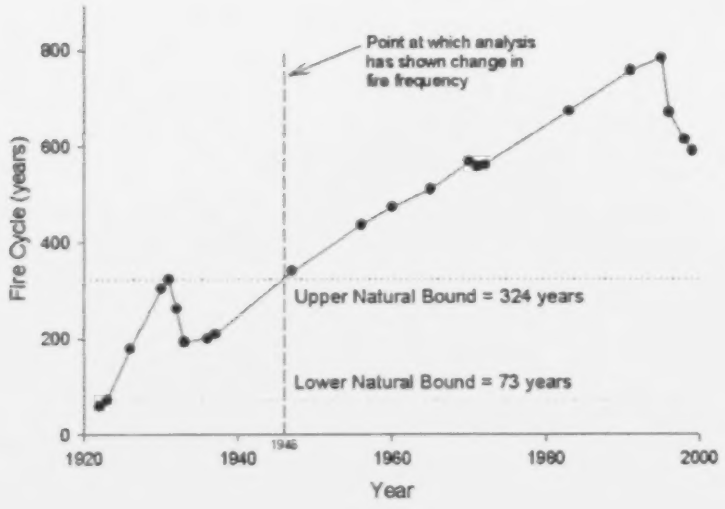


Figure D-3. Example of a cumulative estimated fire cycle graph.

Professional opinion or personal judgement was used to strengthen the results because it is understood that the digital fire history atlas does not include small fires, does not represent a comprehensive catalogue of all fires to have occurred since 1920. Also, as the preferred time period for estimating fires is longer than the time period for which data is available, and the ecodistrict is a very small area within which to be estimating fire cycles, the estimates may need to be adjusted based on reasoned reflection. If data for a particular ecodistrict was found to be limited there was the possibility for returning abnormal results. In this case, some interpolation from surrounding ecodistricts was used.

It is expected the methodology described above produces estimates of fire cycle range that are larger than would be provided by a more complete data set. As fire cycle is a statistical construct, small data sets suggest greater variability than theoretically warranted. This suggests that the BNV estimated using these fire cycles may be larger, more conservative and more inclusive than desirable. Users should interpret the data accordingly.

Appendix E

Relative Flammability of Forest Units

FU relatve flammability breakdown.

(-10 years)	(no change)	(+10 years)	(+25 years)
Short	Medium	Long	Very Long
BfDom	HrdMw	BwDom	OCLow
ConMx	SbDee	HrDom	OthHd
PjDee	SbMx1	PoDee	PrDom
PjMx1			PrwMx
			PwDom
			SbLow
			Shrub

Natural Fire Cycle Variation (Example)

Site District	Low est.	High est.
4S-1	40	110
3W-5	90	300

4S-1 Low Fire Cycle (40 years)		3W-5 High Fire Cycle (300 years)	
BfDom	30	BfDom	290
BwDom	50	BwDom	310
ConMx	30	ConMx	290
HrdMw	40	HrdMw	300
HrDom	50	HrDom	310
OCLow	65	OCLow	325
OthHd	65	OthHd	325
PjDee	30	PjDee	290
PjMx1	30	PjMx1	290
PoDee	50	PoDee	310
PrDom	65	PrDom	325
PrwMx	65	PrwMx	325
PwDom	65	PwDom	325
SbDee	40	SbDee	300
SbLow	65	SbLow	325
SbMx1	40	SbMx1	00
		Shrub	325

Appendix F

Results
Bounds by FMU

All values are reported in hectares in the following tables.

2004 MU Name			
Armstrong Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,546	12,127
BfDom	mature	3,252	18,426
BfDom	old growth	1,760	11,084
BwDom	immature	487	6,612
BwDom	mature	831	3,989
BwDom	old growth	200	486
ConMx	immature	3,712	9,350
ConMx	mature	4,363	8,155
ConMx	old growth	1,071	5,963
HrdMw	immature	1,866	22,707
HrdMw	mature	1,679	23,041
HrdMw	old growth	1,511	10,806
HrDom	immature	1,186	16,442
HrDom	mature	1,137	7,966
HrDom	old growth	428	1,202
OCLow	immature	344	874
OCLow	mature	474	697
OCLow	old growth	430	1,169
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	4,733	76,641
PjDee	mature	4,173	23,421
PjDee	old growth	2,896	4,579
PjMx1	immature	7,887	36,862
PjMx1	mature	6,588	14,276
PjMx1	old growth	2,838	4,835
PoDee	immature	2,723	46,681
PoDee	mature	2,766	19,550
PoDee	old growth	2,583	4,887
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	29,583	79,802
SbDee	mature	53,478	167,283
SbDee	old growth	15,887	77,567
SbLow	immature	8,349	21,553
SbLow	mature	23,425	28,097
SbLow	old growth	4,379	13,499
SbMx1	immature	8,235	23,039
SbMx1	mature	10,063	15,408
SbMx1	old growth	3,496	7,626
Shrub	immature	466	1,759
Shrub	mature	1,040	4,618
Shrub	old growth	338	1,258

2004 MU Name			
Big Pic Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,421	13,891
BfDom	mature	5,748	35,907
BfDom	old growth	3,416	24,129
BwDom	immature	923	10,025
BwDom	mature	1,585	6,454
BwDom	old growth	1,171	2,145
ConMx	immature	7,404	14,649
ConMx	mature	8,129	13,331
ConMx	old growth	3,009	9,156
HrdMw	immature	3,032	24,198
HrdMw	mature	3,259	28,197
HrdMw	old growth	2,912	18,379
HrDom	immature	2,228	24,604
HrDom	mature	2,625	13,096
HrDom	old growth	860	2,218
OCLow	immature	479	1,106
OCLow	mature	748	936
OCLow	old growth	529	1,319
OthHd	immature	4	9
OthHd	mature	3	5
OthHd	old growth	8	15
PjDee	immature	7,710	99,816
PjDee	mature	5,382	28,753
PjDee	old growth	1,501	3,213
PjMx1	immature	9,654	47,444
PjMx1	mature	7,631	19,421
PjMx1	old growth	4,006	7,313
PoDee	immature	4,122	56,817
PoDee	mature	4,661	24,757
PoDee	old growth	2,076	4,987
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	18,995	51,324
SbDee	mature	36,874	136,626
SbDee	old growth	16,683	87,718
SbLow	immature	6,833	15,811
SbLow	mature	15,974	17,038
SbLow	old growth	4,686	13,115
SbMx1	immature	15,822	46,320
SbMx1	mature	20,350	33,842
SbMx1	old growth	10,396	28,586
Shrub	immature	337	950
Shrub	mature	668	1,927
Shrub	old growth	487	1,188

2004 MU Name			
Armstrong Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,546	12,127
BfDom	mature	3,252	18,426
BfDom	old growth	1,760	11,084
BwDom	immature	487	6,612
BwDom	mature	831	3,989
BwDom	old growth	200	486
ConMx	immature	3,712	9,350
ConMx	mature	4,363	8,155
ConMx	old growth	1,071	5,963
HrdMw	immature	1,866	22,707
HrdMw	mature	1,679	23,041
HrdMw	old growth	1,511	10,806
HrDom	immature	1,186	16,442
HrDom	mature	1,137	7,966
HrDom	old growth	428	1,202
OCLow	immature	344	874
OCLow	mature	474	697
OCLow	old growth	430	1,169
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	4,733	76,641
PjDee	mature	4,173	23,421
PjDee	old growth	2,896	4,579
PjMx1	immature	7,887	36,862
PjMx1	mature	6,588	14,276
PjMx1	old growth	2,838	4,835
PoDee	immature	2,723	46,681
PoDee	mature	2,766	19,550
PoDee	old growth	2,583	4,887
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	29,583	79,802
SbDee	mature	53,478	167,283
SbDee	old growth	15,887	77,567
SbLow	immature	8,349	21,553
SbLow	mature	23,425	28,097
SbLow	old growth	4,379	13,499
SbMx1	immature	8,235	23,039
SbMx1	mature	10,063	15,408
SbMx1	old growth	3,496	7,626
Shrub	immature	466	1,759
Shrub	mature	1,040	4,618
Shrub	old growth	338	1,258

2004 MU Name			
Big Pic Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,421	13,891
BfDom	mature	5,748	35,907
BfDom	old growth	3,416	24,129
BwDom	immature	923	10,025
BwDom	mature	1,585	6,454
BwDom	old growth	1,171	2,145
ConMx	immature	7,404	14,649
ConMx	mature	8,129	13,331
ConMx	old growth	3,009	9,156
HrdMw	immature	3,032	24,198
HrdMw	mature	3,259	28,197
HrdMw	old growth	2,912	18,379
HrDom	immature	2,228	24,604
HrDom	mature	2,625	13,096
HrDom	old growth	860	2,218
OCLow	immature	479	1,106
OCLow	mature	748	936
OCLow	old growth	529	1,319
OthHd	immature	4	9
OthHd	mature	3	5
OthHd	old growth	8	15
PjDee	immature	7,710	99,816
PjDee	mature	5,382	28,753
PjDee	old growth	1,501	3,213
PjMx1	immature	9,654	47,444
PjMx1	mature	7,631	19,421
PjMx1	old growth	4,006	7,313
PoDee	immature	4,122	56,817
PoDee	mature	4,661	24,757
PoDee	old growth	2,076	4,987
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	18,995	51,324
SbDee	mature	36,874	136,626
SbDee	old growth	16,683	87,718
SbLow	immature	6,833	15,811
SbLow	mature	15,974	17,038
SbLow	old growth	4,686	13,115
SbMx1	immature	15,822	46,320
SbMx1	mature	20,350	33,842
SbMx1	old growth	10,396	28,586
Shrub	immature	337	950
Shrub	mature	668	1,927
Shrub	old growth	487	1,188

2004 MU Name			
Black Sturgeon Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,252	16,641
BfDom	mature	3,470	32,941
BfDom	old growth	965	9,250
BwDom	immature	1,370	11,825
BwDom	mature	2,292	10,166
BwDom	old growth	474	1,719
ConMx	immature	6,505	11,726
ConMx	mature	5,944	8,506
ConMx	old growth	1,829	5,289
HrdMw	immature	4,119	15,726
HrdMw	mature	3,535	11,614
HrdMw	old growth	2,806	10,891
HrDom	immature	2,865	18,938
HrDom	mature	2,726	9,635
HrDom	old growth	917	2,075
OCLow	immature	2,380	5,641
OCLow	mature	3,263	4,402
OCLow	old growth	2,543	6,871
OthHd	immature	3	6
OthHd	mature	2	3
OthHd	old growth	5	10
PjDee	immature	3,842	58,559
PjDee	mature	3,023	14,800
PjDee	old growth	836	1,523
PjMx1	immature	4,303	22,984
PjMx1	mature	3,325	8,185
PjMx1	old growth	1,432	2,989
PoDee	immature	4,958	49,223
PoDee	mature	4,331	19,433
PoDee	old growth	2,266	4,634
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	6	15
PrwMx	mature	8	12
PrwMx	old growth	6	19
PwDom	immature	28	90
PwDom	mature	55	85
PwDom	old growth	18	63
SbDee	immature	9,838	23,561
SbDee	mature	14,321	54,450
SbDee	old growth	2,830	14,486
SbLow	immature	3,404	8,026
SbLow	mature	6,518	7,437
SbLow	old growth	2,507	7,804
SbMx1	immature	8,667	25,387
SbMx1	mature	9,494	18,245
SbMx1	old growth	3,617	11,677
Shrub	immature	2,177	8,295
Shrub	mature	4,303	17,007
Shrub	old growth	4,954	15,756

2004 MU Name			
Caribou Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	232	1,550
BfDom	mature	876	6,406
BfDom	old growth	693	4,192
BwDom	immature	99	2,177
BwDom	mature	178	1,017
BwDom	old growth	62	82
ConMx	immature	2,381	10,653
ConMx	mature	3,360	8,536
ConMx	old growth	938	5,836
HrdMw	immature	630	25,372
HrdMw	mature	759	22,539
HrdMw	old growth	678	10,493
HrDom	immature	781	17,234
HrDom	mature	986	7,727
HrDom	old growth	664	1,609
OCLow	immature	91	210
OCLow	mature	251	271
OCLow	old growth	63	162
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	7,845	76,051
PjDee	mature	8,022	25,014
PjDee	old growth	4,486	6,319
PjMx1	immature	8,490	33,391
PjMx1	mature	7,369	13,283
PjMx1	old growth	3,191	5,363
PoDee	immature	1,363	33,083
PoDee	mature	1,695	12,578
PoDee	old growth	1,301	2,707
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	2	6
PrwMx	mature	3	6
PrwMx	old growth	5	10
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	39,788	92,301
SbDee	mature	65,901	182,436
SbDee	old growth	20,084	84,226
SbLow	immature	8,930	20,428
SbLow	mature	27,493	36,933
SbLow	old growth	1,356	3,957
SbMx1	immature	8,360	22,006
SbMx1	mature	9,450	13,330
SbMx1	old growth	2,511	4,813

2004 MU Name			
Crossroute Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,467	27,049
BfDom	mature	6,933	65,083
BfDom	old growth	2,013	23,610
BwDom	immature	807	13,429
BwDom	mature	990	5,355
BwDom	old growth	147	303
ConMx	immature	13,935	24,124
ConMx	mature	7,219	20,305
ConMx	old growth	1,679	9,361
HrdMw	immature	6,832	49,601
HrdMw	mature	6,722	57,631
HrdMw	old growth	7,488	30,378
HrDom	immature	3,664	46,682
HrDom	mature	4,531	20,336
HrDom	old growth	955	2,006
OCLow	immature	9,372	24,222
OCLow	mature	16,387	19,731
OCLow	old growth	5,475	19,120
OthHd	immature	4,517	11,741
OthHd	mature	4,944	5,838
OthHd	old growth	6,340	16,214
PjDee	immature	31,676	303,293
PjDee	mature	22,623	63,540
PjDee	old growth	2,403	7,506
PjMx1	immature	29,147	84,892
PjMx1	mature	13,126	33,385
PjMx1	old growth	2,420	11,762
PoDee	immature	14,762	238,775
PoDee	mature	17,257	89,384
PoDee	old growth	7,186	12,656
PrDom	immature	670	2,611
PrDom	mature	819	1,673
PrDom	old growth	394	1,679
PrwMx	immature	2,120	6,105
PrwMx	mature	3,175	4,814
PrwMx	old growth	1,452	5,508
PwDom	immature	2,397	8,042
PwDom	mature	4,016	6,221
PwDom	old growth	963	4,130
SbDee	immature	11,893	25,899
SbDee	mature	19,922	159,662
SbDee	old growth	11,855	132,081
SbLow	immature	7,991	21,780
SbLow	mature	18,750	29,494
SbLow	old growth	1,445	5,295
SbMx1	immature	25,919	49,294
SbMx1	mature	23,914	76,388
SbMx1	old growth	5,795	31,102

2004 MU Name			
Dog River-Matawin Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,190	11,230
BfDom	mature	2,824	26,717
BfDom	old growth	812	9,906
BwDom	immature	614	9,328
BwDom	mature	1,091	4,359
BwDom	old growth	260	569
ConMx	immature	10,422	14,271
ConMx	mature	6,701	16,372
ConMx	old growth	1,281	6,512
HrdMw	immature	2,742	29,995
HrdMw	mature	2,946	28,020
HrdMw	old growth	2,556	16,919
HrDom	immature	2,118	27,453
HrDom	mature	2,351	12,367
HrDom	old growth	1,113	2,273
OCLow	immature	680	1,605
OCLow	mature	1,269	1,489
OCLow	old growth	359	1,077
OthHd	immature	28	73
OthHd	mature	19	32
OthHd	old growth	44	101
PjDee	immature	13,215	168,198
PjDee	mature	10,096	35,129
PjDee	old growth	2,238	5,867
PjMx1	immature	14,974	57,647
PjMx1	mature	9,481	18,247
PjMx1	old growth	1,864	7,613
PoDee	immature	5,594	96,159
PoDee	mature	5,533	33,882
PoDee	old growth	4,690	8,238
PrDom	immature	9	26
PrDom	mature	11	18
PrDom	old growth	9	30
PrwMx	immature	16	46
PrwMx	mature	27	36
PrwMx	old growth	11	38
PwDom	immature	56	231
PwDom	mature	130	207
PwDom	old growth	20	91
SbDee	immature	15,521	33,793
SbDee	mature	17,442	114,903
SbDee	old growth	9,780	97,513
SbLow	immature	7,069	19,446
SbLow	mature	13,931	24,107
SbLow	old growth	1,917	6,693
SbMx1	immature	17,758	37,446
SbMx1	mature	13,715	37,235
SbMx1	old growth	3,498	15,699

2004 MU Name			
Dryden Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	766	8,180
BfDom	mature	2,381	20,471
BfDom	old growth	1,139	9,777
BwDom	immature	125	1,645
BwDom	mature	86	625
BwDom	old growth	1	3
ConMx	immature	1,948	5,161
ConMx	mature	3,021	8,164
ConMx	old growth	1,007	5,425
HrdMw	immature	1,565	9,578
HrdMw	mature	1,393	12,544
HrdMw	old growth	693	3,673
HrDom	immature	460	10,164
HrDom	mature	401	4,731
HrDom	old growth	61	302
OCLow	immature	363	981
OCLow	mature	547	790
OCLow	old growth	420	1,228
OthHd	immature	56	1,470
OthHd	mature	40	667
OthHd	old growth	116	2,034
PjDee	immature	4,213	41,993
PjDee	mature	3,508	12,169
PjDee	old growth	536	1,059
PjMx1	immature	4,493	17,789
PjMx1	mature	3,819	6,688
PjMx1	old growth	1,108	2,715
PoDee	immature	990	26,751
PoDee	mature	1,110	10,953
PoDee	old growth	320	959
PrDom	immature	41	174
PrDom	mature	51	134
PrDom	old growth	48	215
PrwMx	immature	30	85
PrwMx	mature	42	69
PrwMx	old growth	32	95
PwDom	immature	13	43
PwDom	mature	26	41
PwDom	old growth	8	29
SbDee	immature	4,785	15,643
SbDee	mature	8,763	37,276
SbDee	old growth	3,028	20,159
SbLow	immature	629	2,328
SbLow	mature	1,746	3,817
SbLow	old growth	130	417
SbMx1	immature	5,289	16,828
SbMx1	mature	6,558	11,414
SbMx1	old growth	1,734	6,421

2004 MU Name			
English River - Brightsands Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,841	22,350
BfDom	mature	4,375	43,600
BfDom	old growth	903	10,057
BwDom	immature	778	10,185
BwDom	mature	1,104	4,362
BwDom	old growth	207	520
ConMx	immature	10,280	18,673
ConMx	mature	5,934	19,761
ConMx	old growth	1,254	8,644
HrdMw	immature	4,150	45,357
HrdMw	mature	2,834	43,118
HrdMw	old growth	1,775	19,849
HrDom	immature	2,677	40,225
HrDom	mature	2,366	16,775
HrDom	old growth	790	2,290
OCLow	immature	738	1,769
OCLow	mature	1,484	1,826
OCLow	old growth	437	1,171
OthHd	immature	1	3
OthHd	mature	1	1
OthHd	old growth	2	4
PjDee	immature	25,579	254,995
PjDee	mature	21,103	60,961
PjDee	old growth	4,637	11,191
PjMx1	immature	20,494	77,773
PjMx1	mature	14,751	24,633
PjMx1	old growth	4,468	14,751
PoDee	immature	4,810	98,493
PoDee	mature	4,003	31,862
PoDee	old growth	2,449	5,606
PrDom	immature	17	45
PrDom	mature	22	33
PrDom	old growth	14	39
PrwMx	immature	106	271
PrwMx	mature	146	204
PrwMx	old growth	69	217
PwDom	immature	86	248
PwDom	mature	141	205
PwDom	old growth	36	151
SbDee	immature	35,939	80,063
SbDee	mature	43,945	210,879
SbDee	old growth	17,078	125,274
SbLow	immature	6,115	13,865
SbLow	mature	12,938	18,577
SbLow	old growth	1,175	3,943
SbMx1	immature	26,543	59,578
SbMx1	mature	22,295	45,886
SbMx1	old growth	4,612	16,889

2004 MU Name			
Kenogami Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	3,660	21,233
BfDom	mature	10,896	64,493
BfDom	old growth	8,434	43,765
BwDom	immature	1,916	19,479
BwDom	mature	3,634	13,260
BwDom	old growth	2,750	4,906
ConMx	immature	11,542	26,935
ConMx	mature	14,281	26,871
ConMx	old growth	5,442	18,164
HrdMw	immature	4,962	53,178
HrdMw	mature	5,688	64,305
HrdMw	old growth	5,013	37,328
HrDom	immature	3,471	43,230
HrDom	mature	3,926	22,933
HrDom	old growth	1,280	3,983
OCLow	immature	9,813	24,734
OCLow	mature	17,535	22,972
OCLow	old growth	15,531	35,647
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	13,309	166,867
PjDee	mature	10,581	51,153
PjDee	old growth	3,834	6,899
PjMx1	immature	17,218	82,177
PjMx1	mature	14,035	34,214
PjMx1	old growth	7,545	12,326
PoDee	immature	6,804	106,254
PoDee	mature	7,938	47,355
PoDee	old growth	4,232	10,208
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	7
PwDom	old growth	3	9
SbDee	immature	68,063	190,720
SbDee	mature	139,185	354,718
SbDee	old growth	67,191	247,221
SbLow	immature	55,638	147,141
SbLow	mature	169,641	192,679
SbLow	old growth	48,199	126,579
SbMx1	immature	26,369	76,178
SbMx1	mature	35,939	56,947
SbMx1	old growth	17,524	46,709
Shrub	immature	823	2,260
Shrub	mature	2,401	6,687
Shrub	old growth	1,465	3,659

2004 MU Name			
Kenora Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	746	10,586
BfDom	mature	1,700	21,043
BfDom	old growth	342	5,908
BwDom	immature	471	7,514
BwDom	mature	458	2,787
BwDom	old growth	20	43
ConMx	immature	8,296	13,705
ConMx	mature	3,392	11,452
ConMx	old growth	299	1,661
HrdMw	immature	4,388	31,965
HrdMw	mature	3,120	31,709
HrdMw	old growth	3,019	17,435
HrDom	immature	1,645	19,211
HrDom	mature	1,671	8,356
HrDom	old growth	186	581
OCLow	immature	5,241	11,729
OCLow	mature	8,382	11,840
OCLow	old growth	1,887	6,304
OthHd	immature	1,310	3,113
OthHd	mature	1,326	1,541
OthHd	old growth	1,658	4,461
PjDee	immature	39,422	248,949
PjDee	mature	22,387	41,345
PjDee	old growth	1,886	9,662
PjMx1	immature	20,248	52,099
PjMx1	mature	7,103	22,790
PjMx1	old growth	1,645	10,591
PoDee	immature	10,808	147,045
PoDee	mature	8,867	46,424
PoDee	old growth	3,490	8,601
PrDom	immature	283	938
PrDom	mature	306	518
PrDom	old growth	108	354
PrwMx	immature	1,029	2,371
PrwMx	mature	1,456	1,879
PrwMx	old growth	745	2,669
PwDom	immature	962	3,223
PwDom	mature	1,461	2,324
PwDom	old growth	326	1,446
SbDee	immature	10,930	32,344
SbDee	mature	12,077	97,288
SbDee	old growth	5,429	64,072
SbLow	immature	2,986	5,912
SbLow	mature	4,711	6,684
SbLow	old growth	399	1,411
SbMx1	immature	17,271	32,599
SbMx1	mature	11,978	36,489
SbMx1	old growth	2,412	12,650

2004 MU Name			
Lac Seul Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,067	16,379
BfDom	mature	2,748	32,198
BfDom	old growth	958	10,467
BwDom	immature	301	4,930
BwDom	mature	385	2,154
BwDom	old growth	78	164
ConMx	immature	11,195	27,491
ConMx	mature	8,375	27,284
ConMx	old growth	1,484	9,979
HrdMw	immature	5,011	50,952
HrdMw	mature	3,523	46,684
HrdMw	old growth	1,564	19,024
HrDom	immature	2,672	47,312
HrDom	mature	2,354	19,556
HrDom	old growth	1,080	3,083
OCLow	immature	579	2,721
OCLow	mature	1,070	2,151
OCLow	old growth	468	2,805
OthHd	immature	21	98
OthHd	mature	14	45
OthHd	old growth	38	147
PjDee	immature	23,554	215,815
PjDee	mature	19,038	55,292
PjDee	old growth	5,387	15,618
PjMx1	immature	16,982	69,396
PjMx1	mature	12,776	22,471
PjMx1	old growth	4,064	13,369
PoDee	immature	3,430	86,271
PoDee	mature	2,616	27,955
PoDee	old growth	1,538	4,058
PrDom	immature	54	172
PrDom	mature	70	126
PrDom	old growth	58	186
PrwMx	immature	37	122
PrwMx	mature	58	98
PrwMx	old growth	33	113
PwDom	immature	9	26
PwDom	mature	14	21
PwDom	old growth	7	26
SbDee	immature	46,751	104,267
SbDee	mature	56,866	232,483
SbDee	old growth	14,455	94,317
SbLow	immature	4,949	17,499
SbLow	mature	10,095	25,960
SbLow	old growth	476	1,571
SbMx1	immature	21,779	60,184
SbMx1	mature	19,218	39,165
SbMx1	old growth	3,916	14,566

2004 MU Name			
Lake Nipigon Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,874	19,815
BfDom	mature	7,045	42,926
BfDom	old growth	3,615	26,013
BwDom	immature	1,034	12,116
BwDom	mature	1,461	7,361
BwDom	old growth	611	1,431
ConMx	immature	8,081	16,328
ConMx	mature	8,555	13,741
ConMx	old growth	2,430	9,166
HrdMw	immature	4,178	29,947
HrdMw	mature	4,056	33,342
HrdMw	old growth	3,338	20,132
HrDom	immature	2,831	28,282
HrDom	mature	2,707	14,570
HrDom	old growth	966	2,534
OCLow	immature	1,964	4,601
OCLow	mature	3,240	3,915
OCLow	old growth	2,147	5,407
OthHd	immature	4	10
OthHd	mature	3	5
OthHd	old growth	8	16
PjDee	immature	7,471	109,865
PjDee	mature	5,418	31,114
PjDee	old growth	1,756	3,659
PjMx1	immature	10,861	56,871
PjMx1	mature	8,799	23,382
PjMx1	old growth	4,335	7,364
PoDee	immature	4,693	65,896
PoDee	mature	4,123	26,966
PoDee	old growth	2,175	5,423
PrDom	immature	9	25
PrDom	mature	11	19
PrDom	old growth	12	32
PrwMx	immature	6	17
PrwMx	mature	9	14
PrwMx	old growth	7	21
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	26,936	82,395
SbDee	mature	53,658	181,677
SbDee	old growth	20,224	99,828
SbLow	immature	11,198	29,528
SbLow	mature	28,817	37,879
SbLow	old growth	6,341	18,491
SbMx1	immature	16,062	51,210
SbMx1	mature	22,675	38,750
SbMx1	old growth	10,162	26,540
Shrub	immature	2,635	8,040
Shrub	mature	3,058	10,766
Shrub	old growth	2,862	8,382

2004 MU Name			
Lakehead Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	4,009	15,132
BfDom	mature	5,640	31,424
BfDom	old growth	1,795	11,734
BwDom	immature	699	7,117
BwDom	mature	1,274	4,738
BwDom	old growth	384	704
ConMx	immature	8,045	19,973
ConMx	mature	6,294	11,779
ConMx	old growth	1,286	3,396
HrdMw	immature	3,853	20,082
HrdMw	mature	4,334	23,135
HrdMw	old growth	4,901	17,375
HrDom	immature	2,781	25,467
HrDom	mature	3,844	15,264
HrDom	old growth	2,004	3,466
OCLow	immature	2,387	6,051
OCLow	mature	5,068	5,698
OCLow	old growth	2,672	6,753
OthHd	immature	371	968
OthHd	mature	256	510
OthHd	old growth	1,104	1,984
PjDee	immature	5,872	59,248
PjDee	mature	4,056	14,930
PjDee	old growth	990	1,712
PjMx1	immature	8,659	38,090
PjMx1	mature	6,322	14,253
PjMx1	old growth	1,270	3,254
PoDee	immature	6,548	69,357
PoDee	mature	7,430	33,064
PoDee	old growth	4,739	8,167
PrDom	immature	79	249
PrDom	mature	105	217
PrDom	old growth	175	408
PrwMx	immature	122	414
PrwMx	mature	252	362
PrwMx	old growth	113	321
PwDom	immature	114	367
PwDom	mature	207	373
PwDom	old growth	123	346
SbDee	immature	7,244	14,304
SbDee	mature	11,839	55,063
SbDee	old growth	10,770	56,570
SbLow	immature	955	2,793
SbLow	mature	2,640	4,076
SbLow	old growth	467	1,374
SbMx1	immature	8,025	18,527
SbMx1	mature	12,145	30,140
SbMx1	old growth	9,554	25,706
Shrub	immature	1,048	3,014
Shrub	mature	2,900	8,623
Shrub	old growth	1,152	3,602

2004 MU Name			
Ogoki Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	174	1,145
BfDom	mature	862	5,368
BfDom	old growth	5,961	18,873
BwDom	immature	99	3,646
BwDom	mature	207	1,929
BwDom	old growth	162	419
ConMx	immature	1,234	11,860
ConMx	mature	3,028	12,362
ConMx	old growth	2,019	8,526
HrdMw	immature	474	30,485
HrdMw	mature	799	31,519
HrdMw	old growth	1,172	18,580
HrDom	immature	251	14,073
HrDom	mature	343	7,639
HrDom	old growth	364	2,407
OCLow	immature	1,060	2,946
OCLow	mature	2,406	3,028
OCLow	old growth	2,080	4,592
OthHd	immature	2	7
OthHd	mature	1	4
OthHd	old growth	10	17
PjDee	immature	3,307	36,611
PjDee	mature	3,439	14,808
PjDee	old growth	1,938	3,111
PjMx1	immature	5,126	22,652
PjMx1	mature	5,386	11,886
PjMx1	old growth	3,873	5,550
PoDee	immature	1,081	38,682
PoDee	mature	1,554	17,773
PoDee	old growth	2,240	5,675
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	63,119	172,752
SbDee	mature	130,392	257,126
SbDee	old growth	60,060	201,302
SbLow	immature	41,622	118,310
SbLow	mature	171,084	205,901
SbLow	old growth	29,977	76,358
SbMx1	immature	6,663	19,169
SbMx1	mature	9,381	16,762
SbMx1	old growth	5,252	8,186

2004 MU Name			
Pic River Ojibway Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	954	3,037
BfDom	mature	3,700	16,587
BfDom	old growth	1,743	8,493
BwDom	immature	869	8,531
BwDom	mature	1,756	6,653
BwDom	old growth	1,607	2,685
ConMx	immature	1,752	4,431
ConMx	mature	2,852	4,013
ConMx	old growth	1,540	5,142
HrdMw	immature	962	7,388
HrdMw	mature	1,821	15,631
HrdMw	old growth	1,751	12,087
HrDom	immature	830	7,964
HrDom	mature	879	4,833
HrDom	old growth	268	861
OCLow	immature	66	163
OCLow	mature	146	176
OCLow	old growth	123	250
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	2,362	25,040
PjDee	mature	1,755	9,555
PjDee	old growth	499	1,453
PjMx1	immature	3,413	15,691
PjMx1	mature	2,897	8,233
PjMx1	old growth	1,329	2,549
PoDee	immature	1,125	15,656
PoDee	mature	1,058	7,766
PoDee	old growth	276	1,082
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	4,812	16,116
SbDee	mature	13,335	34,245
SbDee	old growth	6,044	23,133
SbLow	immature	420	1,313
SbLow	mature	1,592	2,522
SbLow	old growth	257	608
SbMx1	immature	4,738	15,143
SbMx1	mature	11,314	21,002
SbMx1	old growth	8,202	26,591
Shrub	immature	795	2,217
Shrub	mature	2,079	5,737
Shrub	old growth	1,011	2,512

2004 MU Name			
Quetico Provincial Park			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	674	3,409
BfDom	mature	2,054	16,412
BfDom	old growth	583	5,795
BwDom	immature	311	5,695
BwDom	mature	771	2,688
BwDom	old growth	130	223
ConMx	immature	6,136	8,860
ConMx	mature	3,409	10,972
ConMx	old growth	749	3,912
HrdMw	immature	1,471	19,017
HrdMw	mature	2,447	19,256
HrdMw	old growth	1,882	9,783
HrDom	immature	835	15,470
HrDom	mature	1,835	7,610
HrDom	old growth	532	1,035
OCLow	immature	450	1,155
OCLow	mature	910	994
OCLow	old growth	296	893
OthHd	immature	210	535
OthHd	mature	139	232
OthHd	old growth	327	745
PjDee	immature	8,536	101,021
PjDee	mature	7,689	22,739
PjDee	old growth	1,780	3,958
PjMx1	immature	10,536	30,651
PjMx1	mature	5,675	11,979
PjMx1	old growth	1,005	3,906
PoDee	immature	3,420	67,710
PoDee	mature	5,211	25,033
PoDee	old growth	2,719	5,073
PrDom	immature	516	1,570
PrDom	mature	664	1,092
PrDom	old growth	497	1,650
PrwMx	immature	2,915	8,828
PrwMx	mature	4,266	6,567
PrwMx	old growth	2,449	8,879
PwDom	immature	1,294	4,019
PwDom	mature	2,075	3,170
PwDom	old growth	867	3,482
SbDee	immature	3,840	8,010
SbDee	mature	5,907	56,353
SbDee	old growth	4,879	58,479
SbLow	immature	360	916
SbLow	mature	910	1,328
SbLow	old growth	47	185
SbMx1	immature	7,405	13,013
SbMx1	mature	6,367	20,396
SbMx1	old growth	2,776	10,626

2004 MU Name			
Red Lake Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	271	3,856
BfDom	mature	835	10,435
BfDom	old growth	133	2,071
BwDom	immature	44	1,610
BwDom	mature	82	573
BwDom	old growth	13	27
ConMx	immature	2,461	4,914
ConMx	mature	1,726	8,732
ConMx	old growth	153	1,629
HrdMw	immature	1,047	12,854
HrdMw	mature	742	14,853
HrdMw	old growth	192	3,094
HrDom	immature	295	8,790
HrDom	mature	272	3,585
HrDom	old growth	19	128
OCLow	immature	89	251
OCLow	mature	177	198
OCLow	old growth	81	259
OthHd	immature	7	19
OthHd	mature	5	9
OthHd	old growth	13	30
PjDee	immature	16,614	105,339
PjDee	mature	13,953	25,608
PjDee	old growth	1,959	7,217
PjMx1	immature	5,353	18,696
PjMx1	mature	3,472	5,896
PjMx1	old growth	1,450	6,383
PoDee	immature	552	27,285
PoDee	mature	507	7,844
PoDee	old growth	109	684
PrDom	immature	31	152
PrDom	mature	38	106
PrDom	old growth	35	165
PrwMx	immature	14	39
PrwMx	mature	18	29
PrwMx	old growth	13	44
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	3,587	5,503
SbDee	mature	6,231	42,042
SbDee	old growth	2,575	27,559
SbLow	immature	1,449	5,016
SbLow	mature	3,233	5,654
SbLow	old growth	777	2,947
SbMx1	immature	3,931	8,267
SbMx1	mature	3,245	6,550
SbMx1	old growth	865	7,669

2004 MU Name			
Sapawe Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	531	4,298
BfDom	mature	1,243	10,479
BfDom	old growth	332	4,150
BwDom	immature	187	3,610
BwDom	mature	309	1,654
BwDom	old growth	74	185
ConMx	immature	3,509	5,397
ConMx	mature	2,150	6,112
ConMx	old growth	398	2,132
HrdMw	immature	965	12,120
HrdMw	mature	1,156	11,857
HrdMw	old growth	958	5,324
HrDom	immature	552	10,549
HrDom	mature	753	4,720
HrDom	old growth	269	568
OCLow	immature	1,195	3,130
OCLow	mature	2,253	2,466
OCLow	old growth	782	2,598
OthHd	immature	160	390
OthHd	mature	105	169
OthHd	old growth	238	533
PjDee	immature	6,772	70,439
PjDee	mature	5,105	15,602
PjDee	old growth	917	2,194
PjMx1	immature	7,215	21,649
PjMx1	mature	3,974	8,077
PjMx1	old growth	726	2,732
PoDee	immature	1,551	38,450
PoDee	mature	1,880	13,714
PoDee	old growth	1,088	2,594
PrDom	immature	171	740
PrDom	mature	210	522
PrDom	old growth	163	795
PrwMx	immature	445	1,185
PrwMx	mature	608	881
PrwMx	old growth	336	1,109
PwDom	immature	352	1,265
PwDom	mature	649	1,081
PwDom	old growth	152	652
SbDee	immature	3,375	6,562
SbDee	mature	4,841	34,413
SbDee	old growth	3,516	38,271
SbLow	immature	1,262	2,965
SbLow	mature	2,861	4,131
SbLow	old growth	179	647
SbMx1	immature	6,287	10,689
SbMx1	mature	5,679	15,672
SbMx1	old growth	1,772	7,817

2004 MU Name			
Spruce River Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,036	21,629
BfDom	mature	3,035	33,685
BfDom	old growth	881	11,195
BwDom	immature	1,236	11,972
BwDom	mature	2,082	6,359
BwDom	old growth	413	1,287
ConMx	immature	10,615	15,734
ConMx	mature	6,787	14,889
ConMx	old growth	1,592	7,781
HrdMw	immature	4,203	30,728
HrdMw	mature	3,115	28,055
HrdMw	old growth	2,645	17,723
HrDom	immature	3,513	31,707
HrDom	mature	3,552	14,383
HrDom	old growth	1,423	2,975
OCLow	immature	1,671	3,838
OCLow	mature	3,125	3,612
OCLow	old growth	1,060	2,837
OthHd	immature	1	2
OthHd	mature	1	1
OthHd	old growth	2	3
PjDee	immature	15,518	223,365
PjDee	mature	12,113	53,788
PjDee	old growth	2,679	13,635
PjMx1	immature	12,704	60,476
PjMx1	mature	9,196	18,186
PjMx1	old growth	2,796	15,516
PoDee	immature	7,555	90,917
PoDee	mature	6,951	32,226
PoDee	old growth	5,062	8,277
PrDom	immature	8	20
PrDom	mature	10	14
PrDom	old growth	7	20
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	15	43
PwDom	mature	24	37
PwDom	old growth	10	33
SbDee	immature	23,327	51,579
SbDee	mature	24,033	142,521
SbDee	old growth	11,009	104,067
SbLow	immature	7,590	21,358
SbLow	mature	16,310	31,036
SbLow	old growth	1,049	3,359
SbMx1	immature	20,193	48,841
SbMx1	mature	15,420	35,880
SbMx1	old growth	3,471	21,387
Shrub	immature	452	1,972
Shrub	mature	865	4,025
Shrub	old growth	721	2,326

2004 MU Name			
Trout Lake Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	181	2,449
BfDom	mature	855	10,950
BfDom	old growth	298	4,922
BwDom	immature	149	6,382
BwDom	mature	169	1,998
BwDom	old growth	36	120
ConMx	immature	8,271	27,505
ConMx	mature	5,285	20,334
ConMx	old growth	900	8,535
HrdMw	immature	2,207	51,084
HrdMw	mature	1,818	38,818
HrdMw	old growth	693	17,338
HrDom	immature	1,509	34,966
HrDom	mature	1,469	13,465
HrDom	old growth	710	2,667
OCLow	immature	110	217
OCLow	mature	181	259
OCLow	old growth	14	44
OthHd	immature	1	2
OthHd	mature	0	1
OthHd	old growth	1	2
PjDee	immature	36,282	255,466
PjDee	mature	27,762	50,007
PjDee	old growth	4,901	16,401
PjMx1	immature	20,069	58,128
PjMx1	mature	10,230	21,363
PjMx1	old growth	3,117	13,194
PoDee	immature	2,894	99,384
PoDee	mature	2,383	26,859
PoDee	old growth	1,227	3,803
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	72,419	131,181
SbDee	mature	57,449	235,942
SbDee	old growth	11,644	85,733
SbLow	immature	10,641	20,912
SbLow	mature	18,805	27,034
SbLow	old growth	919	3,295
SbMx1	immature	22,994	51,694
SbMx1	mature	17,235	39,437
SbMx1	old growth	4,038	19,966

2004 MU Name			
Wabigoon Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,001	23,157
BfDom	mature	4,895	42,754
BfDom	old growth	1,415	13,242
BwDom	immature	411	5,536
BwDom	mature	387	2,147
BwDom	old growth	30	54
ConMx	immature	5,931	12,330
ConMx	mature	5,071	16,287
ConMx	old growth	1,398	6,885
HrdMw	immature	4,179	27,603
HrdMw	mature	3,400	35,166
HrdMw	old growth	1,634	7,895
HrDom	immature	1,614	28,996
HrDom	mature	1,708	13,283
HrDom	old growth	144	611
OCLow	immature	2,042	4,659
OCLow	mature	3,115	3,595
OCLow	old growth	1,730	4,788
OthHd	immature	298	637
OthHd	mature	255	302
OthHd	old growth	397	783
PjDee	immature	20,874	170,236
PjDee	mature	16,254	44,248
PjDee	old growth	2,068	4,172
PjMx1	immature	17,293	51,312
PjMx1	mature	11,807	19,508
PjMx1	old growth	3,162	8,506
PoDee	immature	2,922	70,406
PoDee	mature	2,791	24,429
PoDee	old growth	517	1,762
PrDom	immature	25	73
PrDom	mature	34	56
PrDom	old growth	26	71
PrwMx	immature	116	314
PrwMx	mature	165	246
PrwMx	old growth	89	269
PwDom	immature	104	311
PwDom	mature	188	265
PwDom	old growth	48	174
SbDee	immature	11,219	28,235
SbDee	mature	20,396	103,148
SbDee	old growth	8,239	58,168
SbLow	immature	2,517	5,969
SbLow	mature	5,712	8,054
SbLow	old growth	591	1,962
SbMx1	immature	16,594	37,224
SbMx1	mature	19,722	39,659
SbMx1	old growth	4,604	15,805

2004 MU Name			
Wabikimi Provincial Park			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	328	2,259
BfDom	mature	1,293	9,074
BfDom	old growth	1,003	6,208
BwDom	immature	91	2,675
BwDom	mature	109	1,083
BwDom	old growth	18	38
ConMx	immature	828	6,468
ConMx	mature	1,403	6,065
ConMx	old growth	438	4,482
HrdMw	immature	406	21,870
HrdMw	mature	448	22,452
HrdMw	old growth	411	8,643
HrDom	immature	262	11,454
HrDom	mature	296	5,231
HrDom	old growth	106	535
OCLow	immature	147	380
OCLow	mature	259	329
OCLow	old growth	194	498
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	1
PjDee	immature	4,557	65,996
PjDee	mature	4,796	21,718
PjDee	old growth	3,387	4,403
PjMx1	immature	8,018	34,046
PjMx1	mature	7,330	14,236
PjMx1	old growth	3,401	4,933
PoDee	immature	743	28,235
PoDee	mature	897	10,854
PoDee	old growth	793	2,083
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	34,816	89,682
SbDee	mature	64,977	177,481
SbDee	old growth	19,799	86,663
SbLow	immature	9,111	23,778
SbLow	mature	30,404	38,537
SbLow	old growth	3,429	9,963
SbMx1	immature	5,207	14,279
SbMx1	mature	6,723	10,068
SbMx1	old growth	2,854	4,957

2004 MU Name			
Whiskey Jack Forest			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,289	15,762
BfDom	mature	3,700	40,162
BfDom	old growth	387	5,467
BwDom	immature	280	6,427
BwDom	mature	347	2,474
BwDom	old growth	40	85
ConMx	immature	9,395	17,162
ConMx	mature	5,738	22,543
ConMx	old growth	551	4,582
HrdMw	immature	4,225	40,439
HrdMw	mature	2,831	46,641
HrdMw	old growth	1,923	17,615
HrDom	immature	1,269	30,222
HrDom	mature	1,335	12,468
HrDom	old growth	142	459
OCLow	immature	1,073	2,706
OCLow	mature	1,829	2,138
OCLow	old growth	651	2,295
OthHd	immature	488	1,239
OthHd	mature	389	566
OthHd	old growth	714	1,650
PjDee	immature	36,124	290,344
PjDee	mature	32,704	68,931
PjDee	old growth	4,348	16,814
PjMx1	immature	17,732	63,546
PjMx1	mature	10,928	20,783
PjMx1	old growth	3,920	17,744
PoDee	immature	6,155	118,238
PoDee	mature	5,783	38,950
PoDee	old growth	2,188	5,545
PrDom	immature	147	676
PrDom	mature	185	481
PrDom	old growth	101	603
PrwMx	immature	245	641
PrwMx	mature	352	492
PrwMx	old growth	155	519
PwDom	immature	148	497
PwDom	mature	240	378
PwDom	old growth	60	256
SbDee	immature	14,634	31,369
SbDee	mature	24,915	152,585
SbDee	old growth	9,217	94,465
SbLow	immature	2,546	7,706
SbLow	mature	4,979	8,781
SbLow	old growth	966	3,565
SbMx1	immature	16,514	39,598
SbMx1	mature	14,001	31,604
SbMx1	old growth	2,953	21,224

Appendix G

Results
Bounds by Ecodistrict

Ecoregion		Ecodistrict	
2W		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	15	25
BfDom	old growth	889	3,577
BwDom	immature	1	99
BwDom	mature	2	43
BwDom	old growth	2	12
ConMx	immature	81	2,147
ConMx	mature	346	3,842
ConMx	old growth	400	1,134
HrdMw	immature	34	6,695
HrdMw	mature	70	8,117
HrdMw	old growth	155	4,367
HrDom	immature	20	2,033
HrDom	mature	36	1,120
HrDom	old growth	51	345
OCLow	immature	3,095	8,826
OCLow	mature	6,520	9,059
OCLow	old growth	7,010	15,262
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	59	959
PjDee	mature	84	420
PjDee	old growth	85	145
PjMx1	immature	134	1,278
PjMx1	mature	136	576
PjMx1	old growth	152	243
PoDee	immature	119	8,203
PoDee	mature	193	3,932
PoDee	old growth	255	1,097
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	20,331	64,920
SbDee	mature	47,595	67,415
SbDee	old growth	27,991	72,984
SbLow	immature	15,586	45,687
SbLow	mature	62,495	70,073
SbLow	old growth	17,725	44,113
SbMx1	immature	1,209	4,328
SbMx1	mature	1,254	2,889
SbMx1	old growth	398	561

Ecoregion		Ecodistrict	
2W		3	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	132	2,076
BfDom	old growth	11,780	36,402
BwDom	immature	139	6,468
BwDom	mature	508	3,775
BwDom	old growth	427	1,045
ConMx	immature	1,723	24,164
ConMx	mature	4,777	23,448
ConMx	old growth	4,178	18,196
HrdMw	immature	575	59,411
HrdMw	mature	1,224	61,869
HrdMw	old growth	1,951	37,633
HrDom	immature	221	24,185
HrDom	mature	422	13,204
HrDom	old growth	647	4,553
OCLow	immature	1,621	4,612
OCLow	mature	3,682	4,840
OCLow	old growth	3,565	7,708
OthHd	immature	2	7
OthHd	mature	1	4
OthHd	old growth	10	17
PjDee	immature	5,070	52,380
PjDee	mature	7,519	30,254
PjDee	old growth	3,677	7,308
PjMx1	immature	5,502	28,612
PjMx1	mature	8,016	18,333
PjMx1	old growth	7,364	12,588
PoDee	immature	1,504	63,656
PoDee	mature	2,536	29,539
PoDee	old growth	4,041	10,081
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	8
PwDom	old growth	6	14
SbDee	immature	121,847	353,616
SbDee	mature	262,631	506,348
SbDee	old growth	124,703	420,272
SbLow	immature	67,027	206,667
SbLow	mature	288,820	367,724
SbLow	old growth	57,715	143,315
SbMx1	immature	11,228	34,536
SbMx1	mature	17,210	33,427
SbMx1	old growth	11,286	26,232

Eccregion		Ecodistrict	
3S		1	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	1	13
BfDom	old growth	20	564
BwDom	immature	285	8,473
BwDom	mature	426	2,528
BwDom	old growth	67	195
ConMx	immature	1,697	19,888
ConMx	mature	897	8,888
ConMx	old growth	229	5,317
HrdMw	immature	392	37,778
HrdMw	mature	344	21,565
HrdMw	old growth	282	10,346
HrDom	immature	487	19,879
HrDom	mature	620	6,244
HrDom	old growth	252	1,189
OCLow	immature	198	367
OCLow	mature	289	457
OCLow	old growth	4	12
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	40,562	278,926
PjDee	mature	23,084	55,453
PjDee	old growth	3,487	25,081
PjMx1	immature	12,065	24,770
PjMx1	mature	3,743	12,103
PjMx1	old growth	1,010	9,281
PoDee	immature	3,135	81,338
PoDee	mature	3,097	20,477
PoDee	old growth	1,211	3,352
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	26,061	68,167
SbDee	mature	16,662	131,967
SbDee	old growth	3,794	48,840
SbLow	immature	8,880	25,842
SbLow	mature	13,037	32,566
SbLow	old growth	137	458
SbMx1	immature	10,729	23,170
SbMx1	mature	4,521	26,031
SbMx1	old growth	243	2,053

Ecoregion		Ecodistrict	
3S		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	3	102
BfDom	old growth	98	3,150
BwDom	immature	395	15,022
BwDom	mature	639	4,509
BwDom	old growth	113	345
ConMx	immature	5,170	35,652
ConMx	mature	2,058	15,192
ConMx	old growth	491	12,422
HrdMw	immature	1,094	73,416
HrdMw	mature	903	50,180
HrdMw	old growth	464	20,410
HrDom	immature	753	30,732
HrDom	mature	933	10,777
HrDom	old growth	446	2,444
OCLow	immature	325	633
OCLow	mature	518	818
OCLow	old growth	8	22
OthHd	immature	1	2
OthHd	mature	0	1
OthHd	old growth	1	2
PjDee	immature	66,960	472,534
PjDee	mature	45,484	80,267
PjDee	old growth	6,495	38,699
PjMx1	immature	28,330	72,598
PjMx1	mature	8,988	27,448
PjMx1	old growth	2,221	17,507
PoDee	immature	3,097	162,401
PoDee	mature	2,701	39,058
PoDee	old growth	1,293	5,279
PrDom	immature	8	56
PrDom	mature	8	35
PrDom	old growth	4	39
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	111,225	237,002
SbDee	mature	64,141	346,184
SbDee	old growth	10,469	124,870
SbLow	immature	25,943	61,686
SbLow	mature	41,547	80,000
SbLow	old growth	490	1,839
SbMx1	immature	27,745	63,700
SbMx1	mature	15,251	53,206
SbMx1	old growth	4,275	42,881

Ecoregion		Ecodistrict	
2W		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	15	25
BfDom	old growth	889	3,577
BwDom	immature	1	99
BwDom	mature	2	43
BwDom	old growth	2	12
ConMx	immature	81	2,147
ConMx	mature	346	3,842
ConMx	old growth	400	1,134
HrdMw	immature	34	6,695
HrdMw	mature	70	8,117
HrdMw	old growth	155	4,367
HrDom	immature	20	2,033
HrDom	mature	36	1,120
HrDom	old growth	51	345
OCLow	immature	3,095	8,826
OCLow	mature	6,520	9,059
OCLow	old growth	7,010	15,262
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	59	959
PjDee	mature	84	420
PjDee	old growth	85	145
PjMx1	immature	134	1,278
PjMx1	mature	136	576
PjMx1	old growth	152	243
PoDee	immature	119	8,203
PoDee	mature	193	3,932
PoDee	old growth	255	1,097
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	20,331	64,920
SbDee	mature	47,595	67,415
SbDee	old growth	27,991	72,984
SbLow	immature	15,586	45,687
SbLow	mature	62,495	70,073
SbLow	old growth	17,725	44,113
SbMx1	immature	1,209	4,328
SbMx1	mature	1,254	2,889
SbMx1	old growth	398	561

Ecoregion		Ecodistrict	
2W		3	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	132	2,076
BfDom	old growth	11,780	36,402
BwDom	immature	139	6,468
BwDom	mature	508	3,775
BwDom	old growth	427	1,045
ConMx	immature	1,723	24,164
ConMx	mature	4,777	23,448
ConMx	old growth	4,178	18,196
HrdMw	immature	575	59,411
HrdMw	mature	1,224	61,869
HrdMw	old growth	1,951	37,633
HrDom	immature	221	24,185
HrDom	mature	422	13,204
HrDom	old growth	647	4,553
OCLow	immature	1,621	4,612
OCLow	mature	3,682	4,840
OCLow	old growth	3,565	7,708
OthHd	immature	2	7
OthHd	mature	1	4
OthHd	old growth	10	17
PjDee	immature	5,070	52,380
PjDee	mature	7,519	30,254
PjDee	old growth	3,677	7,308
PjMx1	immature	5,502	28,612
PjMx1	mature	8,016	18,333
PjMx1	old growth	7,364	12,588
PoDee	immature	1,504	63,656
PoDee	mature	2,536	29,539
PoDee	old growth	4,041	10,081
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	8
PwDom	old growth	6	14
SbDee	immature	121,847	353,616
SbDee	mature	262,631	506,348
SbDee	old growth	124,703	420,272
SbLow	immature	67,027	206,667
SbLow	mature	288,820	367,724
SbLow	old growth	57,715	143,315
SbMx1	immature	11,228	34,536
SbMx1	mature	17,210	33,427
SbMx1	old growth	11,286	26,232

Ecoregion		Ecodistrict	
3S		1	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	1	13
BfDom	old growth	20	564
BwDom	immature	285	8,473
BwDom	mature	426	2,528
BwDom	old growth	67	195
ConMx	immature	1,697	19,888
ConMx	mature	897	8,888
ConMx	old growth	229	5,317
HrdMw	immature	392	37,778
HrdMw	mature	344	21,565
HrdMw	old growth	282	10,346
HrDom	immature	487	19,879
HrDom	mature	620	6,244
HrDom	old growth	252	1,189
OCLow	immature	198	367
OCLow	mature	289	457
OCLow	old growth	4	12
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	40,562	278,926
PjDee	mature	23,084	55,453
PjDee	old growth	3,487	25,081
PjMx1	immature	12,065	24,770
PjMx1	mature	3,743	12,103
PjMx1	old growth	1,010	9,281
PoDee	immature	3,135	81,338
PoDee	mature	3,097	20,477
PoDee	old growth	1,211	3,352
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	26,061	68,167
SbDee	mature	16,662	131,967
SbDee	old growth	3,794	48,840
SbLow	immature	8,660	25,842
SbLow	mature	13,037	32,566
SbLow	old growth	137	458
SbMx1	immature	10,729	23,170
SbMx1	mature	4,521	26,031
SbMx1	old growth	243	2,053

Ecoregion		Ecodistrict	
3S		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	3	102
BfDom	old growth	98	3,150
BwDom	immature	395	15,022
BwDom	mature	639	4,509
BwDom	old growth	113	345
ConMx	immature	5,170	35,652
ConMx	mature	2,058	15,192
ConMx	old growth	491	12,422
HrdMw	immature	1,094	73,416
HrdMw	mature	903	50,180
HrdMw	old growth	464	20,410
HrDom	immature	753	30,732
HrDom	mature	933	10,777
HrDom	old growth	446	2,444
OCLow	immature	325	633
OCLow	mature	518	818
OCLow	old growth	8	22
OthHd	immature	1	2
OthHd	mature	0	1
OthHd	old growth	1	2
PjDee	immature	66,980	472,534
PjDee	mature	45,484	80,267
PjDee	old growth	6,495	38,699
PjMx1	immature	28,330	72,598
PjMx1	mature	8,988	27,448
PjMx1	old growth	2,221	17,507
PoDee	immature	3,097	162,401
PoDee	mature	2,701	39,058
PoDee	old growth	1,293	5,279
PrDom	immature	8	56
PrDom	mature	8	35
PrDom	old growth	4	39
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	111,225	237,002
SbDee	mature	64,141	346,184
SbDee	old growth	10,469	124,870
SbLow	immature	25,943	61,686
SbLow	mature	41,547	80,000
SbLow	old growth	490	1,839
SbMx1	immature	27,745	63,700
SbMx1	mature	15,251	53,206
SbMx1	old growth	4,275	42,881

Ecoregion		Ecodistrict	
3S		3	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	0	1
BfDom	old growth	3	29
BwDom	immature	103	5,300
BwDom	mature	195	2,251
BwDom	old growth	75	250
ConMx	immature	120	4,205
ConMx	mature	222	3,024
ConMx	old growth	159	607
HrdMw	immature	27	8,153
HrdMw	mature	46	6,675
HrdMw	old growth	48	3,803
HrDom	immature	37	4,340
HrDom	mature	61	1,860
HrDom	old growth	31	388
OCLow	immature	666	1,016
OCLow	mature	1,427	1,758
OCLow	old growth	31	50
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	3,878	19,265
PjDee	mature	3,196	7,270
PjDee	old growth	1,545	2,781
PjMx1	immature	2,511	8,655
PjMx1	mature	1,807	3,590
PjMx1	old growth	842	1,797
PoDee	immature	109	4,442
PoDee	mature	113	1,361
PoDee	old growth	85	239
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	17,244	44,074
SbDee	mature	22,657	57,355
SbDee	old growth	8,848	28,643
SbLow	immature	14,792	25,660
SbLow	mature	31,754	44,441
SbLow	old growth	628	1,200
SbMx1	immature	2,523	7,594
SbMx1	mature	2,490	4,625
SbMx1	old growth	143	356

Ecoregion		Ecodistrict	
3S		4	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	27	97
BfDom	old growth	896	3,155
BwDom	immature	144	3,992
BwDom	mature	437	2,319
BwDom	old growth	240	445
ConMx	immature	1,861	19,620
ConMx	mature	5,571	20,373
ConMx	old growth	3,226	13,858
HrdMw	immature	346	46,259
HrdMw	mature	666	51,682
HrdMw	old growth	872	35,533
HrDom	immature	657	24,912
HrDom	mature	1,186	13,574
HrDom	old growth	993	4,226
OCLow	immature	490	1,051
OCLow	mature	1,856	2,395
OCLow	old growth	45	81
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	12,744	98,408
PjDee	mature	15,158	48,115
PjDee	old growth	10,749	17,511
PjMx1	immature	10,493	42,404
PjMx1	mature	9,258	21,725
PjMx1	old growth	6,515	10,134
PoDee	immature	1,464	48,434
PoDee	mature	2,424	21,834
PoDee	old growth	2,484	6,585
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	2	6
PrwMx	mature	3	6
PrwMx	old growth	5	10
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	105,270	291,064
SbDee	mature	283,883	593,823
SbDee	old growth	81,586	218,505
SbLow	immature	41,814	101,963
SbLow	mature	158,773	232,676
SbLow	old growth	3,481	7,470
SbMx1	immature	14,183	49,648
SbMx1	mature	17,680	39,247
SbMx1	old growth	3,489	7,934

Ecoregion		Ecodistrict	
3S		5	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	99	1,040
BfDom	old growth	366	3,976
BwDom	immature	48	228
BwDom	mature	107	177
BwDom	old growth	43	88
ConMx	immature	9,943	34,535
ConMx	mature	6,808	16,712
ConMx	old growth	1,280	7,624
HrdMw	immature	1,779	56,655
HrdMw	mature	1,577	33,230
HrdMw	old growth	984	19,261
HrDom	immature	2,744	51,819
HrDom	mature	2,473	19,022
HrDom	old growth	1,603	4,536
OCLow	immature	56	116
OCLow	mature	98	166
OCLow	old growth	2	5
OthHd	immature	0	1
OthHd	mature	0	0
OthHd	old growth	0	1
PjDee	immature	29,622	169,116
PjDee	mature	23,730	41,558
PjDee	old growth	5,439	16,776
PjMx1	immature	16,433	55,527
PjMx1	mature	9,017	17,376
PjMx1	old growth	2,899	10,875
PoDee	immature	2,754	64,490
PoDee	mature	2,087	18,260
PoDee	old growth	1,435	3,251
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	66,596	128,942
SbDee	mature	61,317	230,562
SbDee	old growth	11,842	64,415
SbLow	immature	9,287	21,896
SbLow	mature	16,400	31,229
SbLow	old growth	298	819
SbMx1	immature	25,881	63,838
SbMx1	mature	19,821	41,945
SbMx1	old growth	4,037	15,332

Ecoregion		Ecodistrict	
3W		1	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,813	12,634
BfDom	mature	7,557	44,960
BfDom	old growth	3,853	27,684
BwDom	immature	518	11,299
BwDom	mature	555	4,841
BwDom	old growth	5	14
ConMx	immature	4,693	24,602
ConMx	mature	7,811	24,802
ConMx	old growth	1,895	17,761
HrdMw	immature	2,436	80,508
HrdMw	mature	2,702	83,749
HrdMw	old growth	2,136	32,140
HrDom	immature	1,551	45,826
HrDom	mature	1,784	21,678
HrDom	old growth	503	2,063
OCLow	immature	1,264	3,325
OCLow	mature	1,904	2,730
OCLow	old growth	1,677	4,519
OthHd	immature	1	3
OthHd	mature	1	1
OthHd	old growth	3	5
PjDee	immature	15,265	249,231
PjDee	mature	16,037	80,139
PjDee	old growth	11,801	16,014
PjMx1	immature	30,229	136,471
PjMx1	mature	26,481	55,019
PjMx1	old growth	11,324	17,342
PoDee	immature	3,872	119,382
PoDee	mature	4,527	48,252
PoDee	old growth	3,605	9,310
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	121,647	331,181
SbDee	mature	222,266	654,118
SbDee	old growth	64,925	314,129
SbLow	immature	38,663	103,228
SbLow	mature	118,052	155,369
SbLow	old growth	14,747	45,632
SbMx1	immature	20,276	58,104
SbMx1	mature	25,778	39,776
SbMx1	old growth	10,298	18,470

Ecoregion		Ecodistrict	
3W		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	3,403	40,920
BfDom	mature	5,869	71,883
BfDom	old growth	1,287	19,441
BwDom	immature	2,408	24,648
BwDom	mature	3,986	11,809
BwDom	old growth	830	2,115
ConMx	immature	24,626	33,201
ConMx	mature	13,892	36,637
ConMx	old growth	3,011	17,181
HrdMw	immature	8,635	76,388
HrdMw	mature	5,933	70,135
HrdMw	old growth	5,221	43,676
HrDom	immature	7,807	76,794
HrDom	mature	7,788	33,622
HrDom	old growth	3,237	7,143
OCLow	immature	2,180	5,004
OCLow	mature	3,992	5,806
OCLow	old growth	702	1,998
OthHd	immature	14	28
OthHd	mature	9	12
OthHd	old growth	17	36
PjDee	immature	42,057	502,989
PjDee	mature	32,798	112,872
PjDee	old growth	7,311	26,015
PjMx1	immature	33,077	143,691
PjMx1	mature	22,332	42,143
PjMx1	old growth	6,730	32,115
PoDee	immature	17,355	220,042
PoDee	mature	15,807	75,466
PoDee	old growth	11,400	19,294
PrDom	immature	70	174
PrDom	mature	84	121
PrDom	old growth	58	169
PrwMx	immature	122	298
PrwMx	mature	157	219
PrwMx	old growth	90	281
PwDom	immature	47	154
PwDom	mature	85	132
PwDom	old growth	19	76
SbDee	immature	57,892	124,350
SbDee	mature	59,115	344,566
SbDee	old growth	28,376	247,064
SbLow	immature	17,507	43,534
SbLow	mature	35,098	59,274
SbLow	old growth	2,596	8,624
SbMx1	immature	51,705	115,222
SbMx1	mature	36,435	84,343
SbMx1	old growth	6,569	37,601

Ecoregion		Ecodistrict	
3W		3	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	6,821	54,203
BfDom	mature	9,321	81,917
BfDom	old growth	3,063	30,162
BwDom	immature	3,193	30,547
BwDom	mature	5,086	25,919
BwDom	old growth	1,288	3,927
ConMx	immature	17,679	31,804
ConMx	mature	15,792	21,534
ConMx	old growth	4,627	13,543
HrdMw	immature	10,584	41,442
HrdMw	mature	8,864	31,523
HrdMw	old growth	7,420	27,927
HrDom	immature	7,127	49,139
HrDom	mature	6,600	24,988
HrDom	old growth	2,469	5,538
OCLow	immature	5,373	12,754
OCLow	mature	8,114	10,193
OCLow	old growth	5,501	14,783
OthHd	immature	6	14
OthHd	mature	4	6
OthHd	old growth	11	21
PjDee	immature	10,191	168,568
PjDee	mature	7,388	43,604
PjDee	old growth	2,008	4,944
PjMx1	immature	11,666	63,755
PjMx1	mature	9,353	22,990
PjMx1	old growth	3,892	9,209
PoDee	immature	12,610	131,003
PoDee	mature	10,966	52,139
PoDee	old growth	6,845	13,121
PrDom	immature	9	42
PrDom	mature	11	33
PrDom	old growth	12	51
PrwMx	immature	21	65
PrwMx	mature	35	57
PrwMx	old growth	20	59
PwDom	immature	82	263
PwDom	mature	147	243
PwDom	old growth	53	187
SbDee	immature	25,830	65,284
SbDee	mature	38,523	162,867
SbDee	old growth	8,177	49,588
SbLow	immature	8,997	23,504
SbLow	mature	17,716	22,649
SbLow	old growth	6,470	20,140
SbMx1	immature	23,798	70,402
SbMx1	mature	25,646	50,344
SbMx1	old growth	9,417	29,597
Shrub	immature	5,542	20,188
Shrub	mature	9,632	40,031
Shrub	old growth	9,615	31,424

Ecoregion		Ecodistrict	
3W		4	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	4,128	26,286
BfDom	mature	9,588	68,811
BfDom	old growth	5,718	44,461
BwDom	immature	867	11,878
BwDom	mature	1,171	6,125
BwDom	old growth	490	1,007
ConMx	immature	14,178	26,175
ConMx	mature	13,314	23,949
ConMx	old growth	4,148	13,712
HrdMw	immature	5,837	44,652
HrdMw	mature	5,251	46,898
HrdMw	old growth	4,111	26,626
HrDom	immature	3,887	44,402
HrDom	mature	4,356	22,842
HrDom	old growth	1,405	3,629
OCLow	immature	5,600	12,793
OCLow	mature	9,344	11,022
OCLow	old growth	5,924	14,583
OthHd	immature	3	6
OthHd	mature	2	3
OthHd	old growth	5	9
PjDee	immature	14,882	194,792
PjDee	mature	11,281	56,020
PjDee	old growth	3,619	6,513
PjMx1	immature	17,015	85,270
PjMx1	mature	13,402	33,304
PjMx1	old growth	7,152	13,695
PoDee	immature	7,349	102,201
PoDee	mature	8,128	43,011
PoDee	old growth	3,888	8,824
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	7
PwDom	old growth	3	9
SbDee	immature	34,386	91,265
SbDee	mature	62,631	254,042
SbDee	old growth	28,718	160,339
SbLow	immature	29,709	72,111
SbLow	mature	67,810	78,915
SbLow	old growth	20,290	57,196
SbMx1	immature	28,754	82,307
SbMx1	mature	32,045	54,402
SbMx1	old growth	13,645	31,943

Ecoregion		Ecodistrict	
3W		5	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,928	9,141
BfDom	mature	11,220	50,217
BfDom	old growth	5,188	25,703
BwDom	immature	3,683	31,633
BwDom	mature	7,743	25,529
BwDom	old growth	6,697	11,803
ConMx	immature	5,449	13,749
ConMx	mature	9,110	12,432
ConMx	old growth	5,180	16,356
HrdMw	immature	3,013	22,710
HrdMw	mature	5,907	47,547
HrdMw	old growth	5,644	36,569
HrDom	immature	2,754	24,248
HrDom	mature	2,960	14,655
HrDom	old growth	872	2,591
OCLow	immature	206	531
OCLow	mature	522	598
OCLow	old growth	355	749
OthHd	immature	0	0
OthHd	mature	0	0
OthHd	old growth	0	0
PjDee	immature	7,312	74,321
PjDee	mature	5,538	28,290
PjDee	old growth	1,603	4,268
PjMx1	immature	10,801	48,636
PjMx1	mature	9,103	25,438
PjMx1	old growth	4,063	7,664
PoDee	immature	3,820	47,731
PoDee	mature	3,717	23,857
PoDee	old growth	938	3,302
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	15,581	50,921
SbDee	mature	44,215	109,100
SbDee	old growth	20,846	73,815
SbLow	immature	1,335	4,019
SbLow	mature	4,890	7,053
SbLow	old growth	1,149	2,681
SbMx1	immature	14,633	46,914
SbMx1	mature	34,589	63,530
SbMx1	old growth	24,908	81,524
Shrub	immature	3,551	9,493
Shrub	mature	7,373	20,262
Shrub	old growth	4,672	11,444

Ecoregion		Ecodistrict	
4S		1	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	648	9,635
BfDom	mature	627	12,847
BfDom	old growth	248	5,968
BwDom	immature	352	6,721
BwDom	mature	278	2,109
BwDom	old growth	-0	0
ConMx	immature	8,239	19,842
ConMx	mature	2,657	14,898
ConMx	old growth	160	2,057
HrdMw	immature	3,321	54,229
HrdMw	mature	1,515	45,460
HrdMw	old growth	2,417	25,725
HrDom	immature	1,055	17,983
HrDom	mature	676	7,054
HrDom	old growth	35	302
OCLow	immature	744	1,648
OCLow	mature	860	1,226
OCLow	old growth	245	880
OthHd	immature	398	772
OthHd	mature	243	310
OthHd	old growth	313	717
PjDee	immature	124,396	532,657
PjDee	mature	53,588	140,792
PjDee	old growth	5,915	40,685
PjMx1	immature	30,081	77,343
PjMx1	mature	9,557	30,610
PjMx1	old growth	3,156	25,247
PoDee	immature	13,809	212,915
PoDee	mature	10,465	59,623
PoDee	old growth	4,280	13,416
PrDom	immature	37	91
PrDom	mature	41	56
PrDom	old growth	17	57
PrwMx	immature	166	369
PrwMx	mature	201	244
PrwMx	old growth	61	193
PwDom	immature	38	125
PwDom	mature	49	97
PwDom	old growth	12	52
SbDee	immature	17,885	55,988
SbDee	mature	13,995	110,394
SbDee	old growth	5,630	84,504
SbLow	immature	9,984	18,417
SbLow	mature	14,178	21,415
SbLow	old growth	634	2,127
SbMx1	immature	22,578	43,217
SbMx1	mature	12,001	38,752
SbMx1	old growth	2,804	23,973

Ecoregion		Ecodistrict	
4S		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,496	19,683
BfDom	mature	5,065	62,720
BfDom	old growth	730	11,374
BwDom	immature	208	7,208
BwDom	mature	375	2,897
BwDom	old growth	80	182
ConMx	immature	14,470	20,240
ConMx	mature	11,007	48,530
ConMx	old growth	963	9,511
HrdMw	immature	6,445	46,658
HrdMw	mature	4,631	65,860
HrdMw	old growth	1,186	12,073
HrDom	immature	1,776	43,177
HrDom	mature	1,592	18,898
HrDom	old growth	122	665
OCLow	immature	541	2,364
OCLow	mature	961	1,829
OCLow	old growth	560	2,735
OthHd	immature	236	724
OthHd	mature	160	327
OthHd	old growth	457	1,117
PjDee	immature	26,162	323,442
PjDee	mature	24,118	88,688
PjDee	old growth	6,925	15,649
PjMx1	immature	20,123	80,837
PjMx1	mature	16,594	29,562
PjMx1	old growth	6,562	21,482
PoDee	immature	2,790	103,977
PoDee	mature	2,741	35,386
PoDee	old growth	640	2,791
PrDom	immature	65	473
PrDom	mature	88	358
PrDom	old growth	82	563
PrwMx	immature	60	227
PrwMx	mature	103	186
PrwMx	old growth	61	217
PwDom	immature	4	17
PwDom	mature	9	15
PwDom	old growth	3	11
SbDee	immature	8,903	15,175
SbDee	mature	31,281	196,305
SbDee	old growth	13,326	122,604
SbLow	immature	3,271	12,774
SbLow	mature	8,157	14,583
SbLow	old growth	2,151	8,217
SbMx1	immature	15,571	39,605
SbMx1	mature	15,954	30,009
SbMx1	old growth	3,720	22,100

Ecoregion		Ecodistrict	
4S		3	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,494	22,710
BfDom	mature	3,354	42,949
BfDom	old growth	215	3,074
BwDom	immature	265	4,230
BwDom	mature	203	1,651
BwDom	old growth	0	0
ConMx	immature	4,006	13,359
ConMx	mature	3,447	11,428
ConMx	old growth	475	4,079
HrdMw	immature	2,804	21,804
HrdMw	mature	2,176	28,269
HrdMw	old growth	1,247	10,757
HrDom	immature	884	22,279
HrDom	mature	856	9,590
HrDom	old growth	75	362
OCLow	immature	923	2,849
OCLow	mature	1,929	2,571
OCLow	old growth	635	2,359
OthHd	immature	110	466
OthHd	mature	141	232
OthHd	old growth	163	604
PjDee	immature	6,849	74,420
PjDee	mature	6,382	21,403
PjDee	old growth	954	1,787
PjMx1	immature	8,176	37,597
PjMx1	mature	6,825	12,350
PjMx1	old growth	2,158	5,724
PoDee	immature	1,876	52,420
PoDee	mature	1,896	18,084
PoDee	old growth	551	1,738
PrDom	immature	64	196
PrDom	mature	82	144
PrDom	old growth	68	213
PrwMx	immature	29	89
PrwMx	mature	44	71
PrwMx	old growth	26	84
PwDom	immature	15	43
PwDom	mature	23	36
PwDom	old growth	12	42
SbDee	immature	15,904	54,600
SbDee	mature	28,497	111,959
SbDee	old growth	7,250	49,179
SbLow	immature	1,195	3,849
SbLow	mature	2,896	5,193
SbLow	old growth	421	1,467
SbMx1	immature	12,515	46,371
SbMx1	mature	14,527	24,301
SbMx1	old growth	2,197	7,022

Ecoregion		Ecodistrict	
4S		4	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	1,349	12,992
BfDom	mature	3,921	29,395
BfDom	old growth	2,691	23,255
BwDom	immature	203	2,343
BwDom	mature	168	1,033
BwDom	old growth	-0	0
ConMx	immature	2,773	7,147
ConMx	mature	5,491	14,133
ConMx	old growth	1,997	9,973
HrdMw	immature	2,526	12,066
HrdMw	mature	2,440	16,656
HrdMw	old growth	851	4,132
HrDom	immature	676	13,734
HrDom	mature	654	7,242
HrDom	old growth	98	576
OCLow	immature	981	2,642
OCLow	mature	1,678	2,236
OCLow	old growth	1,237	3,386
OthHd	immature	86	491
OthHd	mature	69	241
OthHd	old growth	186	811
PjDee	immature	3,973	40,591
PjDee	mature	3,331	13,554
PjDee	old growth	506	932
PjMx1	immature	5,524	24,073
PjMx1	mature	5,092	10,298
PjMx1	old growth	1,731	3,020
PoDee	immature	1,162	31,416
PoDee	mature	1,223	13,352
PoDee	old growth	298	1,047
PrDom	immature	21	123
PrDom	mature	29	102
PrDom	old growth	29	150
PrwMx	immature	37	113
PrwMx	mature	55	97
PrwMx	old growth	49	140
PwDom	immature	9	36
PwDom	mature	22	38
PwDom	old growth	7	26
SbDee	immature	5,656	22,013
SbDee	mature	11,316	40,792
SbDee	old growth	4,476	24,899
SbLow	immature	1,105	3,496
SbLow	mature	3,298	5,264
SbLow	old growth	498	1,542
SbMx1	immature	6,661	24,145
SbMx1	mature	8,793	15,582
SbMx1	old growth	3,122	9,893

Ecoregion		Ecodistrict	
4S		6	
FU	Status	LowerBound	UpperBound
BfDom	immature	659	10,561
BfDom	mature	2,572	30,105
BfDom	old growth	294	4,676
BwDom	immature	588	9,680
BwDom	mature	656	3,727
BwDom	old growth	19	37
ConMx	immature	6,380	10,904
ConMx	mature	3,335	9,508
ConMx	old growth	209	1,254
HrdMw	immature	5,148	29,453
HrdMw	mature	4,454	28,153
HrdMw	old growth	3,316	10,897
HrDom	immature	2,018	24,779
HrDom	mature	2,248	10,234
HrDom	old growth	271	743
OCLow	immature	8,564	18,307
OCLow	mature	12,335	14,939
OCLow	old growth	3,992	13,852
OthHd	immature	1,607	3,719
OthHd	mature	1,048	1,656
OthHd	old growth	2,170	5,788
PjDee	immature	18,602	167,601
PjDee	mature	12,533	30,810
PjDee	old growth	912	3,255
PjMx1	immature	15,582	40,969
PjMx1	mature	5,736	18,067
PjMx1	old growth	1,089	6,060
PoDee	immature	5,486	107,898
PoDee	mature	5,878	37,167
PoDee	old growth	1,419	2,749
PrDom	immature	696	2,653
PrDom	mature	801	1,553
PrDom	old growth	284	1,183
PrwMx	immature	1,794	4,425
PrwMx	mature	2,665	3,635
PrwMx	old growth	1,301	4,958
PwDom	immature	2,490	8,458
PwDom	mature	4,015	6,246
PwDom	old growth	807	3,608
SbDee	immature	5,256	13,780
SbDee	mature	10,970	90,464
SbDee	old growth	6,192	67,912
SbLow	immature	2,257	5,088
SbLow	mature	4,045	5,320
SbLow	old growth	584	2,244
SbMx1	immature	14,371	25,444
SbMx1	mature	11,646	31,337
SbMx1	old growth	1,685	7,867

Ecoregion		Ecodistrict	
4W		1	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,180	12,176
BfDom	mature	6,781	58,290
BfDom	old growth	2,189	25,676
BwDom	immature	754	17,950
BwDom	mature	1,775	8,290
BwDom	old growth	413	803
ConMx	immature	22,407	32,252
ConMx	mature	12,374	37,797
ConMx	old growth	2,582	13,765
HrdMw	immature	4,404	62,074
HrdMw	mature	6,441	59,378
HrdMw	old growth	6,269	33,116
HrDom	immature	2,296	51,081
HrDom	mature	4,337	23,852
HrDom	old growth	1,706	3,329
OCLow	immature	3,414	9,206
OCLow	mature	6,609	6,994
OCLow	old growth	2,483	8,178
OthHd	immature	2,034	5,331
OthHd	mature	1,342	2,316
OthHd	old growth	3,165	7,427
PjDee	immature	25,007	324,953
PjDee	mature	20,658	70,156
PjDee	old growth	4,665	12,003
PjMx1	immature	34,264	109,375
PjMx1	mature	18,606	39,185
PjMx1	old growth	2,842	12,448
PoDee	immature	9,801	226,545
PoDee	mature	13,680	84,196
PoDee	old growth	9,701	18,889
PrDom	immature	721	2,506
PrDom	mature	928	1,755
PrDom	old growth	704	2,661
PrwMx	immature	3,598	11,036
PrwMx	mature	5,390	8,261
PrwMx	old growth	2,982	10,845
PwDom	immature	1,918	6,278
PwDom	mature	3,228	5,045
PwDom	old growth	1,221	5,021
SbDee	immature	13,824	27,656
SbDee	mature	19,371	168,565
SbDee	old growth	16,664	204,574
SbLow	immature	4,048	12,605
SbLow	mature	9,454	16,212
SbLow	old growth	1,151	4,617
SbMx1	immature	26,552	48,649
SbMx1	mature	22,388	76,462
SbMx1	old growth	8,824	41,917

Ecoregion		Ecodistrict	
4W		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	2,925	6,465
BfDom	mature	3,766	15,442
BfDom	old growth	1,250	6,193
BwDom	immature	54	925
BwDom	mature	165	979
BwDom	old growth	58	126
ConMx	immature	3,432	12,115
ConMx	mature	2,854	7,882
ConMx	old growth	377	884
HrdMw	immature	1,946	10,547
HrdMw	mature	2,529	13,831
HrdMw	old growth	2,745	9,820
HrDom	immature	1,172	13,837
HrDom	mature	1,996	9,276
HrDom	old growth	990	1,980
OCLow	immature	787	2,224
OCLow	mature	2,049	2,508
OCLow	old growth	1,336	3,129
OthHd	immature	324	854
OthHd	mature	226	460
OthHd	old growth	1,034	1,828
PjDee	immature	2,317	15,414
PjDee	mature	1,669	5,798
PjDee	old growth	379	893
PjMx1	immature	4,215	20,672
PjMx1	mature	2,747	8,748
PjMx1	old growth	659	1,206
PoDee	immature	2,076	23,967
PoDee	mature	2,672	14,872
PoDee	old growth	1,022	2,957
PrDom	immature	63	179
PrDom	mature	84	165
PrDom	old growth	160	340
PrwMx	immature	27	80
PrwMx	mature	43	82
PrwMx	old growth	58	129
PwDom	immature	58	180
PwDom	mature	108	205
PwDom	old growth	88	213
SbDee	immature	1,115	3,148
SbDee	mature	5,415	19,530
SbDee	old growth	7,986	32,921
SbLow	immature	272	830
SbLow	mature	1,107	1,717
SbLow	old growth	126	294
SbMx1	immature	1,754	4,777
SbMx1	mature	7,265	17,179
SbMx1	old growth	8,094	20,916
Shrub	immature	396	945
Shrub	mature	1,965	5,126
Shrub	old growth	287	724

Ecoregion		Ecodistrict	
5S		2	
FU	Status	Lower Bound	Upper Bound
BfDom	immature	323	6,410
BfDom	mature	605	17,457
BfDom	old growth	1,234	14,502
BwDom	immature	115	1,026
BwDom	mature	131	422
BwDom	old growth	41	98
ConMx	immature	1,314	5,506
ConMx	mature	414	2,030
ConMx	old growth	544	3,931
HrdMw	immature	1,170	3,359
HrdMw	mature	942	8,888
HrdMw	old growth	2,635	11,270
HrDom	immature	1,016	3,484
HrDom	mature	1,085	1,721
HrDom	old growth	229	445
OCLow	immature	2,624	8,993
OCLow	mature	6,525	10,074
OCLow	old growth	1,149	4,537
OthHd	immature	1,437	4,361
OthHd	mature	2,369	3,553
OthHd	old growth	1,998	6,088
PjDee	immature	1,064	21,745
PjDee	mature	676	3,364
PjDee	old growth	89	288
PjMx1	immature	1,331	6,653
PjMx1	mature	497	1,850
PjMx1	old growth	115	671
PoDee	immature	6,672	69,848
PoDee	mature	7,732	27,918
PoDee	old growth	2,169	3,665
PrDom	immature	9	49
PrDom	mature	11	29
PrDom	old growth	7	38
PrwMx	immature	23	80
PrwMx	mature	34	61
PrwMx	old growth	23	115
PwDom	immature	44	180
PwDom	mature	73	132
PwDom	old growth	28	149
SbDee	immature	2,497	5,374
SbDee	mature	2,357	21,953
SbDee	old growth	656	10,731
SbLow	immature	3,192	10,296
SbLow	mature	9,327	16,684
SbLow	old growth	9	44
SbMx1	immature	2,188	7,934
SbMx1	mature	1,639	11,026
SbMx1	old growth	347	4,909

Appendix H

Results
Bounds by Ecoregion

Ecoregion			
2W			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	146	2,099
BfDom	old growth	12,669	39,980
BwDom	immature	140	6,567
BwDom	mature	510	3,818
BwDom	old growth	430	1,057
ConMx	immature	1,804	26,312
ConMx	mature	5,123	27,290
ConMx	old growth	4,590	19,330
HrdMw	immature	609	66,106
HrdMw	mature	1,294	69,986
HrdMw	old growth	2,106	42,000
HrDom	immature	241	26,218
HrDom	mature	457	14,324
HrDom	old growth	698	4,898
OCLow	immature	4,717	13,138
OCLow	mature	10,202	13,867
OCLow	old growth	10,906	22,970
OthHd	immature	2	7
OthHd	mature	1	4
OthHd	old growth	10	17
PjDee	immature	5,129	53,339
PjDee	mature	7,603	30,673
PjDee	old growth	3,761	7,453
PjMx1	immature	5,635	29,890
PjMx1	mature	8,152	18,909
PjMx1	old growth	7,525	12,831
PoDee	immature	1,623	71,858
PoDee	mature	2,729	33,470
PoDee	old growth	4,296	11,177
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	8
PwDom	old growth	6	14
SbDee	immature	143,103	418,536
SbDee	mature	310,226	573,762
SbDee	old growth	152,974	493,256
SbLow	immature	82,613	249,385
SbLow	mature	352,240	437,353
SbLow	old growth	77,393	187,428
SbMx1	immature	12,456	38,863
SbMx1	mature	18,464	36,316
SbMx1	old growth	11,711	26,696

Ecoregion			
3S			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	130	1,249
BfDom	old growth	1,382	10,471
BwDom	immature	976	33,015
BwDom	mature	1,843	11,785
BwDom	old growth	586	1,199
ConMx	immature	18,791	113,900
ConMx	mature	16,049	64,189
ConMx	old growth	5,384	39,827
HrdMw	immature	3,638	222,262
HrdMw	mature	4,263	163,332
HrdMw	old growth	2,743	89,354
HrDom	immature	4,679	131,682
HrDom	mature	5,289	51,478
HrDom	old growth	3,611	12,635
OCLow	immature	1,734	3,184
OCLow	mature	4,188	5,593
OCLow	old growth	91	170
OthHd	immature	1	3
OthHd	mature	0	1
OthHd	old growth	1	3
PjDee	immature	153,787	1,038,249
PjDee	mature	129,681	218,520
PjDee	old growth	29,732	98,913
PjMx1	immature	69,831	203,954
PjMx1	mature	38,985	72,568
PjMx1	old growth	14,140	48,804
PoDee	immature	10,560	361,106
PoDee	mature	10,422	100,989
PoDee	old growth	7,281	18,493
PrDom	immature	8	56
PrDom	mature	8	35
PrDom	old growth	4	40
PrwMx	immature	2	6
PrwMx	mature	3	6
PrwMx	old growth	5	10
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	338,561	764,120
SbDee	mature	448,660	1,359,891
SbDee	old growth	116,539	485,273
SbLow	immature	100,715	237,047
SbLow	mature	261,511	420,911
SbLow	old growth	5,034	11,786
SbMx1	immature	81,884	207,950
SbMx1	mature	66,807	156,948
SbMx1	old growth	12,215	68,503

Ecoregion			
2W			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	146	2,099
BfDom	old growth	12,669	39,980
BwDom	immature	140	6,567
BwDom	mature	510	3,818
BwDom	old growth	430	1,057
ConMx	immature	1,804	26,312
ConMx	mature	5,123	27,290
ConMx	old growth	4,590	19,330
HrdMw	immature	609	66,106
HrdMw	mature	1,294	69,986
HrdMw	old growth	2,106	42,000
HrDom	immature	241	26,218
HrDom	mature	457	14,324
HrDom	old growth	698	4,898
OCLow	immature	4,717	13,138
OCLow	mature	10,202	13,867
OCLow	old growth	10,906	22,970
OthHd	immature	2	7
OthHd	mature	1	4
OthHd	old growth	10	17
PjDee	immature	5,129	53,339
PjDee	mature	7,603	30,673
PjDee	old growth	3,761	7,453
PjMx1	immature	5,635	29,890
PjMx1	mature	8,152	18,909
PjMx1	old growth	7,525	12,831
PoDee	immature	1,623	71,858
PoDee	mature	2,729	33,470
PoDee	old growth	4,296	11,177
PrDom	immature	0	0
PrDom	mature	0	0
PrDom	old growth	0	0
PrwMx	immature	0	0
PrwMx	mature	0	0
PrwMx	old growth	0	0
PwDom	immature	3	7
PwDom	mature	4	8
PwDom	old growth	6	14
SbDee	immature	143,103	418,536
SbDee	mature	310,226	573,762
SbDee	old growth	152,974	493,256
SbLow	immature	82,613	249,385
SbLow	mature	352,240	437,353
SbLow	old growth	77,393	187,428
SbMx1	immature	12,456	38,863
SbMx1	mature	18,464	36,316
SbMx1	old growth	11,711	26,696

Ecoregion			
3S			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	0	0
BfDom	mature	130	1,249
BfDom	old growth	1,382	10,471
BwDom	immature	976	33,015
BwDom	mature	1,843	11,785
BwDom	old growth	586	1,199
ConMx	immature	18,791	113,900
ConMx	mature	16,049	64,189
ConMx	old growth	5,384	39,827
HrdMw	immature	3,638	222,262
HrdMw	mature	4,263	163,332
HrdMw	old growth	2,743	89,354
HrDom	immature	4,679	131,682
HrDom	mature	5,289	51,478
HrDom	old growth	3,611	12,635
OCLow	immature	1,734	3,184
OCLow	mature	4,188	5,593
OCLow	old growth	91	170
OthHd	immature	1	3
OthHd	mature	0	1
OthHd	old growth	1	3
PjDee	immature	153,787	1,038,249
PjDee	mature	129,681	218,520
PjDee	old growth	29,732	98,913
PjMx1	immature	69,831	203,954
PjMx1	mature	38,985	72,568
PjMx1	old growth	14,140	48,804
PoDee	immature	10,560	361,106
PoDee	mature	10,422	100,989
PoDee	old growth	7,281	18,493
PrDom	immature	8	56
PrDom	mature	8	35
PrDom	old growth	4	40
PrwMx	immature	2	6
PrwMx	mature	3	6
PrwMx	old growth	5	10
PwDom	immature	0	0
PwDom	mature	0	0
PwDom	old growth	0	0
SbDee	immature	338,561	764,120
SbDee	mature	448,660	1,359,891
SbDee	old growth	116,539	485,273
SbLow	immature	100,715	237,047
SbLow	mature	261,511	420,911
SbLow	old growth	5,034	11,786
SbMx1	immature	81,884	207,950
SbMx1	mature	66,807	156,948
SbMx1	old growth	12,215	68,503

Ecoregion			
3W			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	19,093	143,184
BfDom	mature	47,934	307,928
BfDom	old growth	20,054	144,033
BwDom	immature	10,669	110,006
BwDom	mature	18,540	68,976
BwDom	old growth	9,319	18,753
ConMx	immature	67,282	122,219
ConMx	mature	64,112	117,717
ConMx	old growth	18,862	78,554
HrdMw	immature	30,505	265,699
HrdMw	mature	29,765	279,852
HrdMw	old growth	24,608	166,937
HrDom	immature	23,126	240,410
HrDom	mature	23,487	117,785
HrDom	old growth	9,085	20,807
OCLow	immature	14,623	34,407
OCLow	mature	25,344	28,911
OCLow	old growth	14,160	36,633
OthHd	immature	24	51
OthHd	mature	15	23
OthHd	old growth	36	71
PjDee	immature	89,707	1,189,902
PjDee	mature	73,043	320,926
PjDee	old growth	27,911	55,248
PjMx1	immature	102,787	477,824
PjMx1	mature	83,659	178,557
PjMx1	old growth	34,093	78,407
PoDee	immature	45,005	620,359
PoDee	mature	43,146	242,725
PoDee	old growth	27,807	53,851
PrDom	immature	80	216
PrDom	mature	96	154
PrDom	old growth	70	220
PrwMx	immature	143	363
PrwMx	mature	192	276
PrwMx	old growth	110	340
PwDom	immature	132	424
PwDom	mature	236	382
PwDom	old growth	74	272
SbDee	immature	262,170	663,001
SbDee	mature	426,750	1,524,693
SbDee	old growth	151,042	844,935
SbLow	immature	96,210	246,397
SbLow	mature	245,700	322,989
SbLow	old growth	45,253	134,274
SbMx1	immature	139,166	372,948
SbMx1	mature	157,142	280,178
SbMx1	old growth	64,837	199,135
Shrub	immature	9,093	29,681
Shrub	mature	17,005	60,293
Shrub	old growth	14,316	42,798

Ecoregion			
4S			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	8,695	108,806
BfDom	mature	23,043	226,442
BfDom	old growth	4,452	49,147
BwDom	immature	2,350	40,047
BwDom	mature	2,387	15,099
BwDom	old growth	179	354
ConMx	immature	46,931	85,676
ConMx	mature	29,828	110,720
ConMx	old growth	4,843	29,823
HrdMw	immature	27,309	210,331
HrdMw	mature	19,486	239,951
HrdMw	old growth	12,173	74,630
HrDom	immature	9,283	169,297
HrDom	mature	9,296	73,100
HrDom	old growth	921	3,111
OCLow	immature	15,183	35,153
OCLow	mature	23,563	26,958
OCLow	old growth	8,917	29,687
OthHd	immature	3,656	9,707
OthHd	mature	2,597	4,356
OthHd	old growth	4,773	13,299
PjDee	immature	227,766	1,495,286
PjDee	mature	184,003	329,686
PjDee	old growth	18,533	70,349
PjMx1	immature	114,146	345,098
PjMx1	mature	63,774	129,534
PjMx1	old growth	18,567	75,960
PoDee	immature	30,937	637,470
PoDee	mature	27,762	207,227
PoDee	old growth	9,470	22,513
PrDom	immature	1,180	4,464
PrDom	mature	1,410	2,871
PrDom	old growth	700	2,948
PrwMx	immature	3,417	8,902
PrwMx	mature	4,927	7,027
PrwMx	old growth	2,339	8,395
PwDom	immature	3,429	11,349
PwDom	mature	5,592	8,653
PwDom	old growth	1,230	5,235
SbDee	immature	82,907	157,036
SbDee	mature	117,914	712,159
SbDee	old growth	47,781	439,549
SbLow	immature	22,703	54,566
SbLow	mature	42,140	65,089
SbLow	old growth	5,419	19,350
SbMx1	immature	106,834	216,628
SbMx1	mature	96,028	218,380
SbMx1	old growth	20,854	97,136

Ecoregion			
4W			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	5,189	18,641
BfDom	mature	11,275	71,103
BfDom	old growth	3,805	30,241
BwDom	immature	808	18,874
BwDom	mature	1,940	9,268
BwDom	old growth	490	907
ConMx	immature	27,431	44,367
ConMx	mature	16,065	43,234
ConMx	old growth	3,428	14,152
HrdMw	immature	6,351	72,621
HrdMw	mature	8,969	73,208
HrdMw	old growth	9,271	42,936
HrDom	immature	3,467	64,919
HrDom	mature	6,333	33,128
HrDom	old growth	2,778	5,308
OCLow	immature	4,201	11,430
OCLow	mature	8,658	9,502
OCLow	old growth	3,819	11,307
OthHd	immature	2,358	6,185
OthHd	mature	1,568	2,777
OthHd	old growth	4,200	9,256
PjDee	immature	27,325	340,367
PjDee	mature	22,327	75,954
PjDee	old growth	5,185	12,631
PjMx1	immature	38,480	130,047
PjMx1	mature	22,968	44,094
PjMx1	old growth	3,501	13,648
PoDee	immature	11,877	250,512
PoDee	mature	16,352	99,068
PoDee	old growth	10,723	21,845
PrDom	immature	784	2,686
PrDom	mature	1,012	1,920
PrDom	old growth	864	3,001
PrwMx	immature	3,625	11,116
PrwMx	mature	5,433	8,344
PrwMx	old growth	3,040	10,974
PwDom	immature	1,976	6,457
PwDom	mature	3,336	5,250
PwDom	old growth	1,309	5,234
SbDee	immature	15,350	30,599
SbDee	mature	24,787	188,096
SbDee	old growth	24,649	237,495
SbLow	immature	4,320	13,435
SbLow	mature	10,561	17,929
SbLow	old growth	1,277	4,910
SbMx1	immature	29,024	53,426
SbMx1	mature	29,653	93,640
SbMx1	old growth	16,918	61,717
Shrub	immature	396	945
Shrub	mature	1,965	5,126
Shrub	old growth	287	724

Ecoregion			
5S			
FU	Status	Lower Bound	Upper Bound
BfDom	immature	323	6,410
BfDom	mature	605	17,457
BfDom	old growth	1,234	14,502
BwDom	immature	115	1,026
BwDom	mature	131	422
BwDom	old growth	41	98
ConMx	immature	1,314	5,506
ConMx	mature	414	2,030
ConMx	old growth	544	3,931
HrdMw	immature	1,170	3,359
HrdMw	mature	942	8,888
HrdMw	old growth	2,635	11,270
HrDom	immature	1,016	3,484
HrDom	mature	1,085	1,721
HrDom	old growth	229	445
OCLow	immature	2,624	8,993
OCLow	mature	6,525	10,074
OCLow	old growth	1,149	4,537
OthHd	immature	1,437	4,361
OthHd	mature	2,369	3,553
OthHd	old growth	1,998	6,088
PjDee	immature	1,064	21,745
PjDee	mature	676	3,364
PjDee	old growth	89	288
PjMx1	immature	1,331	6,653
PjMx1	mature	497	1,850
PjMx1	old growth	115	671
PoDee	immature	6,672	69,848
PoDee	mature	7,732	27,918
PoDee	old growth	2,169	3,665
PrDom	immature	9	49
PrDom	mature	11	29
PrDom	old growth	7	38
PrwMx	immature	23	80
PrwMx	mature	34	61
PrwMx	old growth	23	115
PwDom	immature	44	180
PwDom	mature	73	132
PwDom	old growth	28	149
SbDee	immature	2,497	5,374
SbDee	mature	2,357	21,953
SbDee	old growth	656	10,731
SbLow	immature	3,192	10,296
SbLow	mature	9,327	16,684
SbLow	old growth	9	44
SbMx1	immature	2,188	7,934
SbMx1	mature	1,639	11,026
SbMx1	old growth	347	4,909

Appendix I

Results
Bounds for the Northwest Region

FU	Status	Lower Bound	Upper Bound
BfDom	immature	33,474	277,041
	mature	85,661	621,150
	old growth	46,294	281,887

FU	Status	Lower Bound	Upper Bound
BwDom	immature	15,057	209,535
	mature	25,352	109,368
	old growth	11,247	22,084

FU	Status	Lower Bound	Upper Bound
ConMx	immature	163,832	385,881
	mature	142,102	360,509
	old growth	37,650	185,618

FU	Status	Lower Bound	Upper Bound
HrdMw	immature	69,581	840,377
	mature	70,021	835,217
	old growth	54,249	427,126

FU	Status	Lower Bound	Upper Bound
HrDom	immature	41,814	636,008
	mature	45,948	291,428
	old growth	17,766	47,087

FU	Status	Lower Bound	Upper Bound
OCLow	immature	43,113	106,305
	mature	83,757	89,625
	old growth	39,051	105,303

FU	Status	Lower Bound	Upper Bound
OthHd	immature	7,478	20,314
	mature	7,499	9,924
	old growth	11,017	28,732

FU	Status	Lower Bound	Upper Bound
PjDee	immature	506,311	4,138,887
	mature	420,413	979,123
	old growth	86,462	242,453

FU	Status	Lower Bound	Upper Bound
PjMx1	immature	333,565	1,193,466
	mature	246,914	407,029
	old growth	78,722	227,840

FU	Status	Lower Bound	Upper Bound
PoDee	immature	106,675	2,011,153
	mature	108,143	711,398
	old growth	62,752	131,337

FU	Status	Lower Bound	Upper Bound
PrDom	immature	2,060	7,471
	mature	2,536	5,009
	old growth	1,645	6,247

FU	Status	Lower Bound	Upper Bound
PrwMx	immature	7,210	20,466
	mature	10,589	15,713
	old growth	5,517	19,834

FU	Status	Lower Bound	Upper Bound
PwDom	immature	5,583	18,418
	mature	9,242	14,425
	old growth	2,647	10,904

FU	Status	Lower Bound	Upper Bound
SbDee	immature	849,283	2,038,667
	mature	1,330,693	4,380,553
	old growth	493,641	2,511,240

FU	Status	Lower Bound	Upper Bound
SbLow	immature	309,754	800,624
	mature	921,479	1,280,955
	old growth	134,385	357,792

FU	Status	Lower Bound	Upper Bound
SbMx1	immature	373,827	897,749
	mature	375,825	783,292
	old growth	126,883	457,945

FU	Status	Lower Bound	Upper Bound
Shrub	immature	9,488	30,627
	mature	19,018	65,275
	old growth	14,603	43,522

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